SAMSUNG

# COLOR TELEVISION RECEIVER

Chassis : S15A

Model: CK331FVR5X/NWT CK331FVR5X/BWT
CK331FVR5X/VWT CK501FVR5S/NWT

# SERVICE Manual

## COLOR TELEVISION RECEIVER

## CONTENTS


1. Precautions
2. Specifications and IC Data
3. Disassembly and Reassembly
4. Alignment and Adjustment
5. Troubleshooting
6. Exploded View and Parts List
7. Electric Parts List
8. Block Diagram
9. PCB Layout Diagram
10. Wiring Diagram
11. Schematic Diagrams

ELECTRONICS

© Samsung Electronics Co., Ltd. **FEB.1999**
Printed in Korea
**3S15A-3121**

# 1. Precautions

Follow these safety, servicing and ESD precautions to prevent damage and protect against potential hazards such as electrical shock and X-rays.

## 1-1 Safety Precautions

1. Be sure that all of the built-in protective devices are replaced. Restore any missing protective shields.

2. When reinstalling the chassis and its assemblies, be sure to restore all protective devices, including: nonmetallic control knobs and compartment covers.

3. Make sure that there are no cabinet openings through which people—particularly children—might insert fingers and contact dangerous voltages. Such openings include the spacing between the picture tube and the cabinet mask, excessively wide cabinet ventilation slots, and improperly fitted back covers.

   If the measured resistance is less than 1.0 megohm or greater than 5.2 megohms, an abnormality exists that must be corrected before the unit is returned to the customer.

4. Leakage Current Hot Check (Figure 1-1):
   Warning: Do not use an isolation transformer during this test. Use a leakage-current tester or a metering system that complies with American National Standards Institute (ANIS C101.1, Leakage Current for Appliances), and Underwriters Laboratories (UL Publication UL1410, 59.7).

5. With the unit completely reassembled, plug the AC line cord directly into the power outlet. With the unit's AC switch first in the ON position and then OFF, measure the current between a known earth ground (metal water pipe, conduit, etc.) and all exposed metal parts, including: antennas, handle brackets, metal cabinets, screwheads and control shafts. The current measured should not exceed 0.5 milliamp. Reverse the power-plug prongs in the AC outlet and repeat the test.

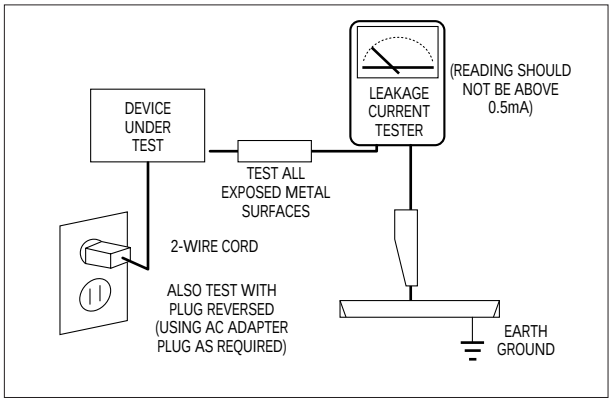

DEVICE UNDER TEST
LEAKAGE CURRENT TESTER
(READING SHOULD NOT BE ABOVE 0.5mA)
TEST ALL EXPOSED METAL SURFACES
2-WIRE CORD
ALSO TEST WITH PLUG REVERSED (USING AC ADAPTER PLUG AS REQUIRED)
EARTH GROUND

Fig. 1-1 AC Leakage Test

6. Antenna Cold Check:
   With the unit's AC plug disconnected from the AC source, connect an electrical jumper across the two AC prongs. Connect one lead of the ohmmeter to an AC prong. Connect the other lead to the coaxial connector.

7. X-ray Limits:
   The picture tube is especially designed to prohibit X-ray emissions. To ensure continued X-ray protection, replace the picture tube only with one that is the same type as the original. Carefully reinstall the picture tube shields and mounting hardware; these also provide X-ray protection.

8. High Voltage Limits:
   High voltage must be measured each time servicing is done on the B+, horizontal deflection or high voltage circuits. Correct operation of the X-ray protection circuits must be reconfirmed whenever they are serviced. (X-ray protection circuits also may be called "horizontal disable" or "hold-down".)

   Heed the high voltage limits. These include the X–ray Protection Specifications Label, and the Product Safety and X-ray Warning Note on the service data schematic.

## 1-1 Safety Precautions (Continued)

9. High voltage is maintained within specified limits by close-tolerance, safety-related components and adjustments. If the high voltage exceeds the specified limits, check each of the special components.

10. Design Alteration Warning:
Never alter or add to the mechanical or electrical design of this unit. Example: Do not add auxiliary audio or video connectors. Such alterations might create a safety hazard. Also, any design changes or additions will void the manufacturer's warranty.

11. Hot Chassis Warning:
Some TV receiver chassis are electrically connected directly to one conductor of the AC power cord. If an isolation transformer is not used, these units may be safely serviced only if the AC power plug is inserted so that the chassis is connected to the ground side of the AC source.

    To confirm that the AC power plug is inserted correctly, do the following: Using an AC voltmeter, measure the voltage between the chassis and a known earth ground. If the reading is greater than 1.0V, remove the AC power plug, reverse its polarity and reinsert. Re-measure the voltage between the chassis and ground.

12. Some TV chassis are designed to operate with 85 volts AC between chassis and ground, regardless of the AC plug polarity. These units can be safely serviced only if an isolation transformer inserted between the receiver and the power source.

13. Some TV chassis have a secondary ground system in addition to the main chassis ground. This secondary ground system is not isolated from the AC power line. The two ground systems are electrically separated by insulating material that must not be defeated or altered.

14. Components, parts and wiring that appear to have overheated or that are otherwise damaged should be replaced with parts that meet the original specifications. Always determine the cause of damage or overheating, and correct any potential hazards.

15. Observe the original lead dress, especially near the following areas: Antenna wiring, sharp edges, and especially the AC and high voltage power supplies. Always inspect for pinched, out-of-place, or frayed wiring. Do not change the spacing between components and the printed circuit board. Check the AC power cord for damage. Make sure that leads and components do not touch thermally hot parts.

16. Picture Tube Implosion Warning:
The picture tube in this receiver employs "integral implosion" protection. To ensure continued implosion protection, make sure that the replacement picture tube is the same as the original.

17. Do not remove, install or handle the picture tube without first putting on shatterproof goggles equipped with side shields. Never handle the picture tube by its neck. Some "in-line" picture tubes are equipped with a permanently attached deflection yoke; do not try to remove such "permanently attached" yokes from the picture tube.

18. Product Safety Notice:
Some electrical and mechanical parts have special safety-related characteristics which might not be obvious from visual inspection. These safety features and the protection they give might be lost if the replacement component differs from the original—even if the replacement is rated for higher voltage, wattage, etc.

    Components that are critical for safety are indicated in the circuit diagram by shading, ( ⚠ ) or ( ⚠ ).
    Use replacement components that have the same ratings, especially for flame resistance and dielectric strength specifications.
    A replacement part that does not have the same safety characteristics as the original might create shock, fire or other hazards.

## 1-2 Servicing Precautions

Warning1: First read the "Safety Precautions" section of this manual. If some unforeseen circumstance creates a conflict between the servicing and safety precautions, always follow the safety precautions.
Warning2: An electrolytic capacitor installed with the wrong polarity might explode.

1. Servicing precautions are printed on the cabinet. Follow them.

2. Always unplug the unit's AC power cord from the AC power source before attempting to: (a) Remove or reinstall any component or assembly, (b) Disconnect an electrical plug or connector, (c) Connect a test component in parallel with an electrolytic capacitor.

3. Some components are raised above the printed circuit board for safety. An insulation tube or tape is sometimes used. The internal wiring is sometimes clamped to prevent contact with thermally hot components. Reinstall all such elements to their original position.

4. After servicing, always check that the screws, components and wiring have been correctly reinstalled. Make sure that the portion around the serviced part has not been damaged.

5. Check the insulation between the blades of the AC plug and accessible conductive parts (examples: metal panels, input terminals and earphone jacks).

6. Insulation Checking Procedure: Disconnect the power cord from the AC source and turn the power switch ON. Connect an insulation resistance meter (500V) to the blades of the AC plug.

   The insulation resistance between each blade of the AC plug and accessible conductive parts (see above) should be greater than 1 megohm.

7. Never defeat any of the B+ voltage interlocks. Do not apply AC power to the unit (or any of its assemblies) unless all solid-state heat sinks are correctly installed.

8. Always connect a test instrument's ground lead to the instrument chassis ground before connecting the positive lead; always remove the instrument's ground lead last.

## 1-3 Precautions for Electrostatically Sensitive Devices (ESDs)

1. Some semiconductor (“solid state”) devices are easily damaged by static electricity. Such components are called Electrostatically Sensitive Devices (ESDs); examples include integrated circuits and some field-effect transistors. The following techniques will reduce the occurrence of component damage caused by static electricity.

2. Immediately before handling any semicon ductor components or assemblies, drain the electrostatic charge from your body by touching a known earth ground. Alternatively, wear a discharging wrist-strap device. (Be sure to remove it prior to applying power—this is an electric shock precaution.)

3. After removing an ESD-equipped assembly, place it on a conductive surface such as aluminum foil to prevent accumulation of electrostatic charge.

4. Do not use freon-propelled chemicals. These can generate electrical charges that damage ESDs.

5. Use only a grounded-tip soldering iron when soldering or unsoldering ESDs.

6. Use only an anti-static solder removal device. Many solder removal devices are not rated as “anti-static”; these can accumulate sufficient electrical charge to damage ESDs.

7. Do not remove a replacement ESD from its protective package until you are ready to install it. Most replacement ESDs are packaged with leads that are electrically shorted together by conductive foam, aluminum foil or other conductive materials.

8. Immediately before removing the protective material from the leads of a replacement ESD, touch the protective material to the chassis or circuit assembly into which the device will be installed.

9. Minimize body motions when handling unpackaged replacement ESDs. Motions such as brushing clothes together, or lifting a foot from a carpeted floor can generate enough static electricity to damage an ESD.

# 2. Specifications and IC Data

## 2-1 Specifications

Television System:

| MODEL | SYSTEM |
|---|---|
| CI | PAL-I (UHF) |
| CII | PAL-I (VHF/UHF) |
| CX | PAL-B/G, SECAM-B/G |
| CK | PAL-B/G, D/K, SECAM-B/G, D/K |
| CW | PAL-B/G, D/K, SECAM-B/G, D/K, NT 4.43 |
| CS | PAL-B/G, D/K, SECAM-B/G, D/K, NT4.43, NT3.58 |

Channels:

| System / Band | PAL/SECAM-B/G,I | PAL, SECAM- D/K | SECAM-K1, PAL-D | NTSC - M |
|---|---|---|---|---|
| VHF | 2 - 12 | 1 - 13 | 2 - 9 | 2 - 13 |
| UHF | 21 - 69 | 21 - 69 | 13 - 57 | 14-69 |

Intermediate Frequencies (MHz) :

| SYSTEM / IF Carrier Frequency | PAL/ SECAM- B/G | PAL/SECAM-D/K, SECAM-K1 | PAL - I | NTSC - M |
|---|---|---|---|---|
| Picture IF Carrier | 38.90 | 38.90 | 38.90 | 38.90 |
| Sound IF Carrier | 33.40 | 32.40 | 32.90 | 34.40 |
| Color Sub Carrier | 34.47 | 34.47 | 34.47 | 35.32 |

Picture Tube:

| | | |
|---|---|---|
| 14 Inch | A34KQV42X | Quick start, in-line-gun, |
| 20 Inch | A48KRD82X(H) | Black stripe, 90°degree deflection |
| 21 Inch | A51KQJ63X | |

Power Requirements: AC 100~260V, 50/60Hz

Antenna Input Impedance: VHF, UHF : Telescopic dipole antenna (75 ohm unbalanced type )

Speaker Impedance
8 ohm, 5W+5W (Dual Type)
16 ohm, 3W (Monitor Type & Dual Type)

## 2-2 IC Line Up

Table 2-1 IC Line-Up

| Loc. No | Specification | Description | Remark |
|---|---|---|---|
| HC101 | PAP103 | IF PRE-AMP | |
| IC201 | TDA8842<br>TDA8841 | PAL/SECAM-B/G, D/K, NTSC<br>PAL-B/G, D/K, NTSC | Philips |
| IC301 | TDA8356 | VERTICAL OUTPUT | |
| IC501 | TDA6107Q | RGB DRIVE AMP | |
| IC601 | TDA7056B | SOUND-AMP (3W x 1CH or 3W x 2CH) | |
| IC602 | TDA7057AQ | SOUND-AMP (5W x 2CH) | Dual Type |
| IC801 | KA3S0680RF | POWER IC (STR) | |
| IC802 | KA7630 | CUSTOM REGULATOR (5V, 8V) | |
| IC901 | SZM173EA | W/O TTX, English/French/Arabian | Zilog (Non TTX) |
| | SZM173AR | W/O TTX, English/Arabian | |
| | SZM173EV | W/O TTX, English/Vietnamese/Indonesian/Malay | |
| | SZM173EC | W/O TTX, English/Chinese | |
| | SZM173ET | W/O TTX, English/Thai | |
| | SZM173EW | W/O TTX, English/German/French/Dutch/Italian/Spanish, Swedish/Yugo/Greek/Croatian | |
| | SZM173EE | W/O TTX,English/Romanian/Hungarian/Polish/Czech/Bulgarian | |
| | SZM173ER | W/O TTX, English/Russian | |
| | SPM175EE | TTX, West : English/German/French/Dutch/Italian/Spanish/Swedish<br>East : English/Czech/Croatian/Romanian/Hungarian/Polish | |
| | SPM175E | TTX, English/French/Swiss | |
| | SPM175ER | TTX, English/Russian/Bulgarian | |
| | SPM175EP | TTX, English/Iranian | Philips (TTX) |
| | SPM175EA | TTX, English/French/Arabian | |
| | SPM175EG | TTX, English/Greek/Yugo | |
| IC902 | 24C04/KS24C040 | EEPROM | |
| PC801 | TCET1108 / LTV817B | PHOTO COUPLER | |

## 2-3 Semiconductor Base Diagrams

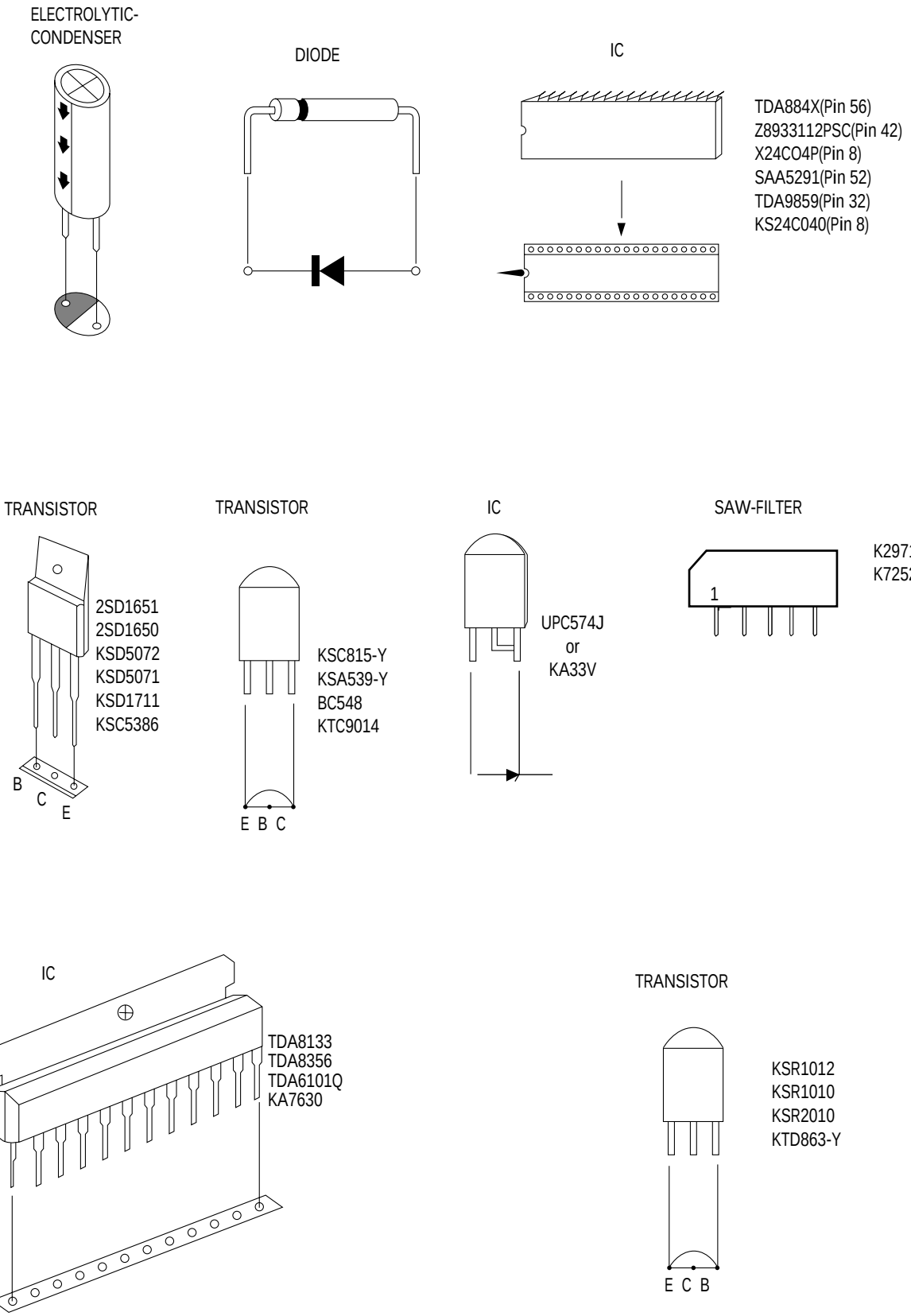
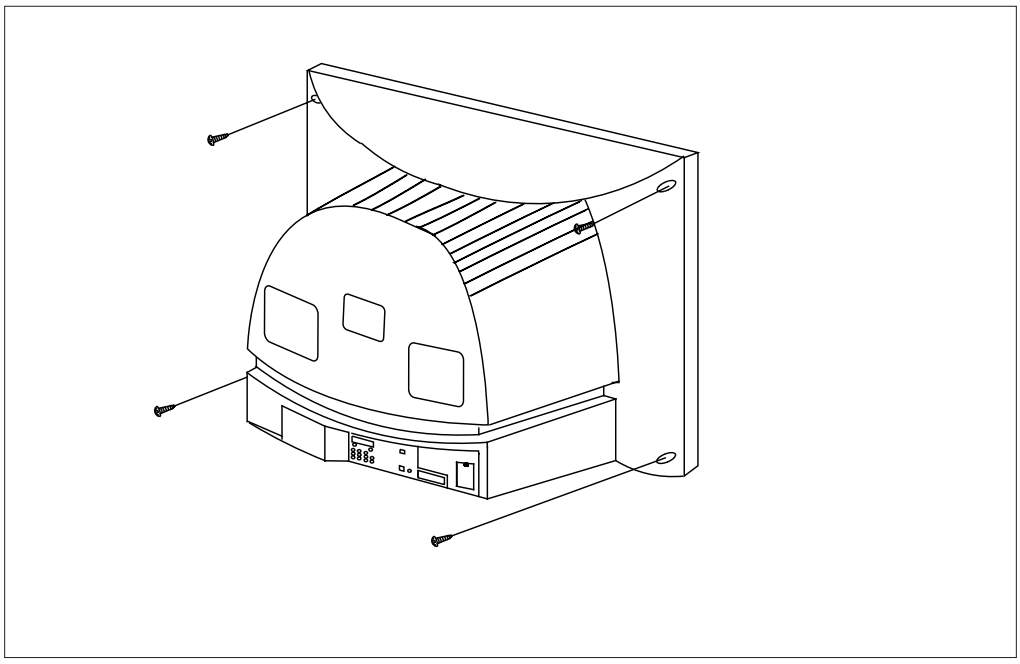



Fig. 2-1 Semiconductor Base Diagrams

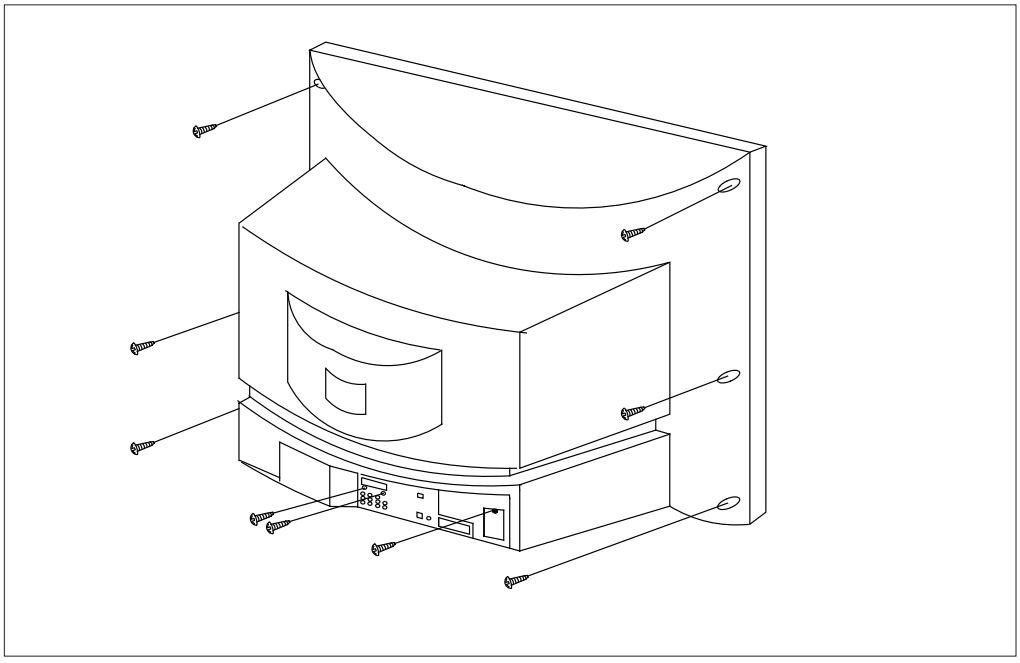
# MEMO

# 3. Disassembly and Reassembly

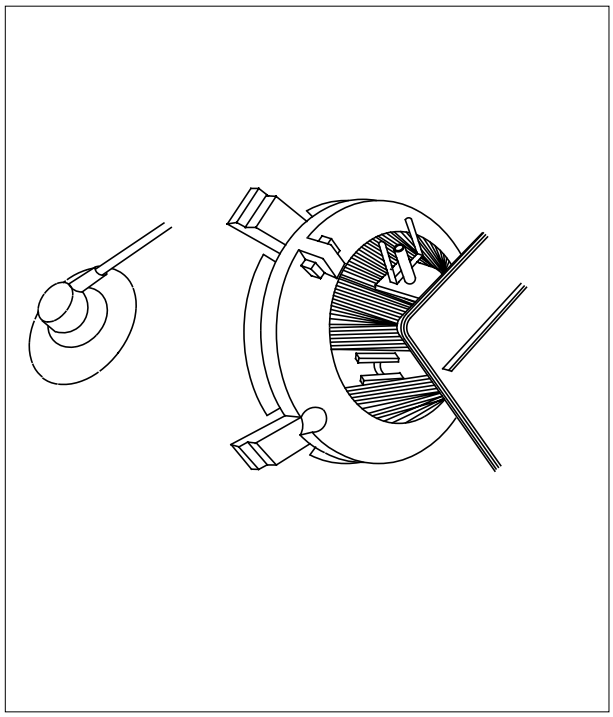
## 3-1 Back Cover Removal

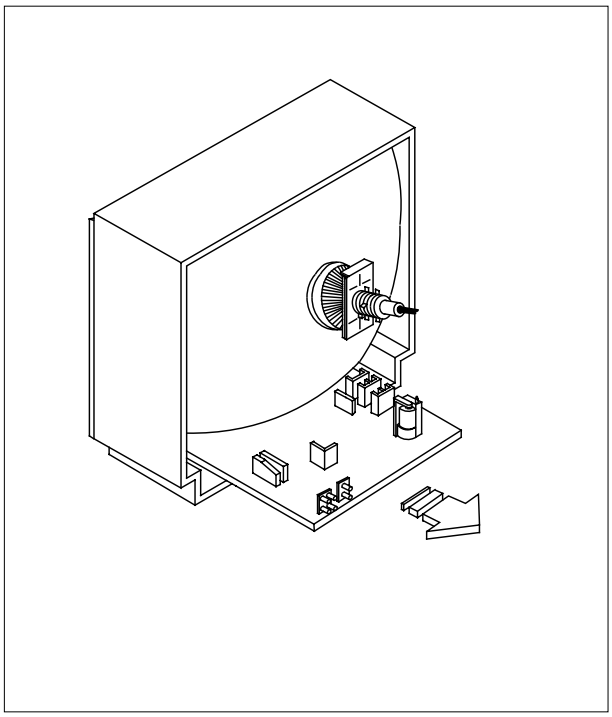


1. After removing the screws, press the tension rib and pull the cabinet backwards.
2. To reassemble, press the tension rib (see diagram).



## 3-2 Main Board Removal

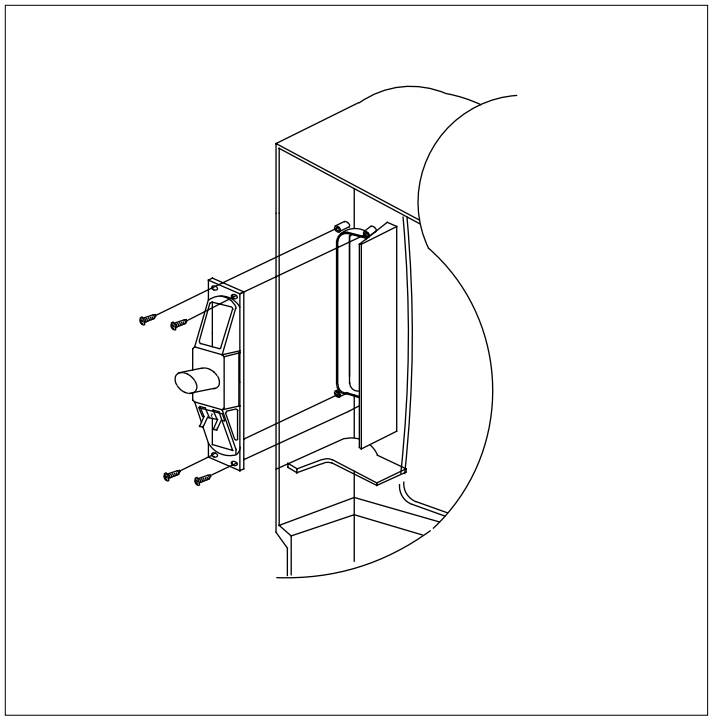




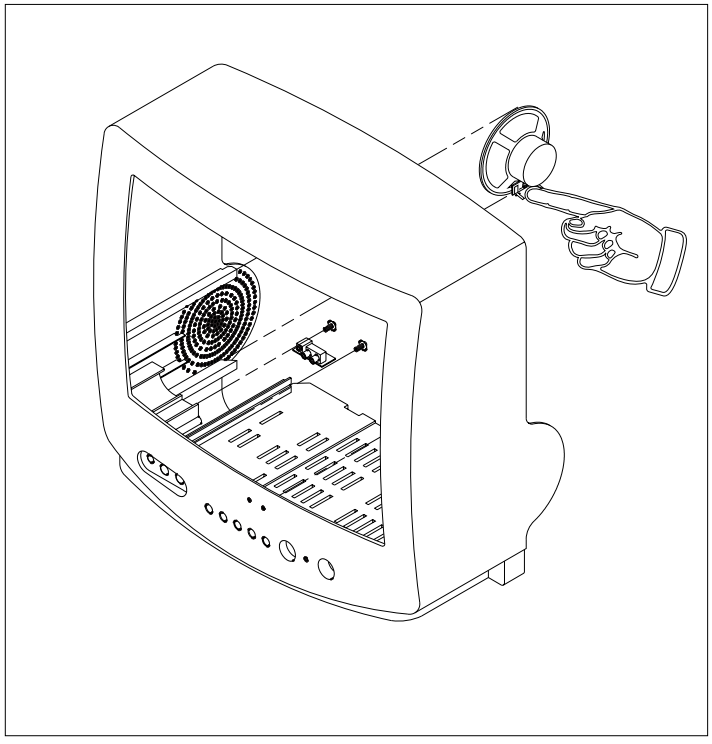
1. Separate the socket board from the CRT neck.
2. Remove the Anode Cap from the CRT.
3. Remove the main board by pulling it with both hands.

Warning: The FBT is charged with high voltage.
Before removing the Anode Cap, discharge the voltage through one of the heat sinks on the main board.

## 3-3 Speaker Removal

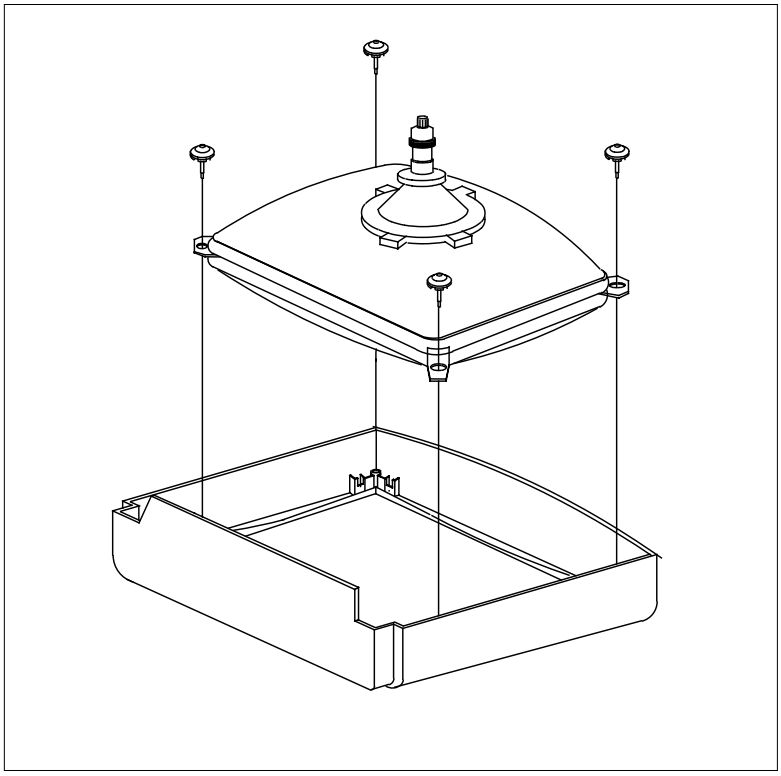


1. Remove the speaker by pressing the tension rib.



1. Remove the screws.
2. Remove the speaker by pressing the tension rib.

## 3-4 CRT Removal



1. Spread a soft mat on the floor. Place the TV set face down.

2. Remove the 4 nuts mounting the CRT to the front cabinet. Lift the CRT.

3. Caution: Because of the high vacuum and large surface area of the picture tube, be careful while handling it: (1) Always lift the picture tube by grasping it firmly around the faceplate, (2) Never lift the tube by its neck. (3) Do not scratch the picture tube or apply excessive pressure. Fractures of the glass may cause an implosion.

# 4. Alignment and Adjustments

## 4-1 Preadjustment

### 4-1-1 Factory Mode

1. Do not attempt these adjustments in the Video Mode.

2. The Factory Mode adjustments are necessary when either the EEPROM (IC902) or the CRT is replaced.

3. Do not tamper with the "Adjustment" screen of the Factory Mode menu. This screen is intended only for factory use.

### 4-1-2 When EEPROM (IC902) Is Replaced

1. When IC902 is replaced all adjustment data revert to initial values. It is necessary to re-program this data.

2. After IC902 is replaced, warm up the TV for 10 seconds.

### 4-1-3 When CRT Is Replaced

1. Make the following adjustments AFTER setting up after setting up purity and convergence :

   White Balance
   Sub-Brightness
   Vertical Center
   Vertical Size
   Horizontal Size
   Fail Safe (This adjustment must be the last step).

2. If the EEPROM or CRT is replaced, set PVA to 45 (factory mode) and set SC as follows.

   14, 16 inch : 0
   20 inch : 10
   21 inch : 12

## 4-2 Factory/Service Mode

### 4-2-1 Procedure for the "Adjustment" Mode

1. This mode uses the standard remote control. The Service Mode is activated by entering the following remote-control sequence :

   (1) SLEEP→FACTORY.

   (2) STAND-BY→ DISPLAY→ P.STD→ MUTE →POWER ON.

2. The "SERVICE (FACTORY)" message will be displayed. The Service Mode has four components: Adjustment, Test Pattern, Option Bytes and Reset.

3. Access the Adjustment Mode by pressing the "VOLUME" keys ( Up or Down). The adjustment parameters are listed in the accompanying table, and selected by pressing the CHANNEL keys (▲ ,▼).

4. Selection sequences for the all system:

   DOWN or UP key:
   AGC>VCO>SBT>SCT>SCR>SC>RG>GG>
   BG>CDL>BLU>PSL>PVS>PVA>PHS>NSR>
   STT

5. The VOLUME keys increase or decrease the adjustment values (stored in the non-volatile memory) when Adjustment Mode is cancelled.

6. Cancel the Adjustment Mode by re-pressing the "FACTORY" or "Power OFF" keys.

## 4-2-2 Main Adjustment Parameter

| Table 4-1 Main Adjustment Parameter (Zilog, Phlips μ-com) | | | | |
|---|---|---|---|---|
| FUNCTION | OSD ABBREVIATION | RANGE | INITIAL DATA | REMARK |
| AUTO GAIN CONTROL | AGC | 0 ~ 63 STEP | 10 | TDA8842 TDA8841 |
| VOLTAGE CONTROL OSCILLATOR | VCO | 0 ~ 128 STEP | 80 | |
| | | 0 ~ 1 STEP | 1 (For East Europe) | |
| SUB BRIGHT | SBT | 0 ~ 23 STEP | 8 | |
| SUB CONTRAST | SCT | 0 ~ 23 STEP | 10 | |
| SUB COLOR | SCR | 0 ~ 23 STEP | 10 | |
| S-CORRECTION | SC | 0 ~ 63 STEP | 12 | |
| RED DRIVE GAIN | RG | 0 ~ 63 STEP | 47 | |
| GREEN DRIVE GAIN | GG | 0 ~ 63 STEP | 32 | |
| BLUE DRIVE GAIN | BG | 0 ~ 63 STEP | 34 | |
| CATHODE DRIVE LEVEL | CDL | 0 ~ 7 STEP | 4 | |
| BLUE STRETCH MODE | BLU | 0 ~ 3 STEP | 0 | |
| PAL VERTICAL SLOPE | PSL | 0 ~ 63 STEP | 32 | |
| PAL VERTICAL SHIFT | PVS | 0 ~ 63 STEP | 32 | |
| PAL VERTICAL AMPLITUDE | PVA | 0 ~ 63 STEP | 42 | |
| PAL HORIZONTAL SHIFT | PHS | 0 ~ 63 STEP | 40 | |
| NTSC SUB COLOR | NSR | 0 ~ 23 STEP | 7 | |
| SUB TINT | STT | 1 ~ 13 STEP | 0 | |
| TTX SUB-CONTRAST | TSS | 0 ~ 63 STEP | 16 (Only TTX Model) | |

NOTE : PVS,PVA, PHS, parameters must be aligned using the 50Hz vertical-field rates.

### 4-2-3 Test Pattern (Aging Mode)

1. This mode can be used during servicing, or for confirming that the convergence and purity adjustments are correct.

2. Access the Test Pattern parameters by pressing a CHANNEL keys (▲ ,▼) while the Service Mode is on. The cursor will move to the test pattern. Press the VOLUME keys. On-screen display:

   • WHITE —— NON -TTX MICOM ONLY

   • AGING —— TTX MICOM

3. AGING Mode (Reference Only)

   This pattern is used for pre-heating the CRT during manufacturing —it is accessed in the factory by twice pressing the “SLEEP → FACTORY→FACTORY “ key, then white pattern will be displayed.

   Even if the TV power is cut off, the Aging Mode is not cancelled, The aging mode is cancelled by repressing the “FACTORY” key or pressing the local “CH UP/DOWN” keys.

### 4-2-4 Option Bytes

In the Service Mode, various can be selected via the Option Bytes (8 bits each). Example:

| SYSTEM OSD DISPLAY | BIT 6 | BIT 5 | BIT 4 | BIT 3 | BIT 2 | BIT 1 | BIT 0 |
|---|---|---|---|---|---|---|---|
| BYTE 0 : 8 - | | | L (BIT : 0) | H (BIT : 8) | L (BIT : 0) | L (BIT : 0) | L (BIT : 0) |
| BYTE 1 : 0 - | L (BIT :0) | L (BIT : 0) | L (BIT : 0) | L (BIT : 0) | L (BIT : 0) | L (BIT : 0) | L (BIT : 0) |

TDA8842, CK SYSTEM, RCA JACK SYSTEM OSD DISPLAY

| | | | | | | |
|---|---|---|---|---|---|---|
| BYTE 0 : 11 | | L (BIT : 1) | H (BIT : 0) | L (BIT : 0) | H (BIT : 0) | L (BIT : 1) |

## 4-2-4 (A) NON-TTX MICOM (SZM-173EC) OPTION BYTE (FOR CHINA/SINGAPORE/GERMAN ARMY)

| | Destination | BYTE 0 | BYTE 1 |
|---|---|---|---|
| MP (Massproduction) OPTION BYTE | China | 15 | 58 |
| | Singapore | 57 | 58 |
| | German Army | 57 | 18 |
| | Hotel ( CB ) | 59 | 1A |

| BYTE | BIT | LOW (0) | HIGH (1) | Application MICOM |
|---|---|---|---|---|
| BYTE 0 | D7 | NOT USED | | MUST LOW |
| | D6 | TV : NORMAL → ZOOM<br>A/V :NORMAL → ZOOM | TV: NORMAL → ZOOM → 16:9<br>A/V : NORMAL → ZOOM | MUST = LOW : China (only)<br>16 : 9 (Delete) |
| | D5 | NOT USED | | MUST = LOW |
| | D4 | CH Up/down functional in the A/V Mode (SCART Jack) | CH Up/down not functional in the A/V Mode (RCA Jack) | MUST = HIGH |
| | D3 | Sound-I System Used | Sound-I System Not Used | |
| | D2 / D1 | (see inner table) | | |
| | D0 | TDA8374A | TDA8842 | IC201 (ONE-CHIP) OPTION |

| D2 | D1 | COLOR SYSTEM | SOUND SYSTEM | Remark |
|---|---|---|---|---|
| 0 | 0 | ● CB : NO OSD | | China MP : CD<br>German Army : CS |
| 0 | 1 | ● CW : ■ RF : AUTO → PAL → SECAM → NT4.43<br>■ A/V : AUTO → PAL → SECAM → NT4.43 → NT3.58 | "?" → B/G → D/K → I | |
| 1 | 0 | ● CD : ■ RF : AUTO → PAL → NT4.43<br>■ A/V : AUTO → PAL → NT4.43 → NT3.58 | "?" → D/K ↔ I | |
| 1 | 1 | ● CS : ■ RF: AUTO → PAL → SECAM → NT4.43 → NT3.58<br>■ A/V: AUTO → PAL → SECAM → NT4.43 → NT3.58 | "?" → B/G → D/K → (I) → NT- M | D3 BIT OPTION |

| BYTE | BIT | | | |
|---|---|---|---|---|
| BYTE 1 | D7 | TV OUT | MONITOR OUT | |
| | D6 | English ONLY | English/Chinese | MUST = HIGH |
| | D5 | AFT ON (always) | AFT OFF (after fine tuning) | BASIC = LOW |
| | D4 | Existing Sharpness level (when using the TDA6108 RGB AMP) | Sharpness level up (when using the TDA6107Q RGB AMP) | BASIC = HIGH |
| | D3 | No Auto Power On | Auto Power On | BASIC = HIGH |
| | D2 | NTSC : 25KHz (NTSC TABLE)<br>PAL : 50KHz (PAL TABLE) | NTSC : 25KHz (NTSC TABLE)<br>PAL : 27KHz (NTSC TABLE) | |
| | D1 | Others | HOTEL | |
| | D0 | NOT USED MUST LOW | | |

● Function Required : 1. PICTURE OFF (after 15 minutes) during no signal
2. AUDIO MUTE during no signal
3. BLUE SCREEN ON/OFF
4. TIMER CLOCK ON/OFF
5. No CHILD LOCK

## 4-2-4 (B) NON-TTX MICOM (SZM-173EW/EE) OPTION BYTE (FOR EUROPE)

| | Destination | BYTE 0 | BYTE 1 |
|---|---|---|---|
| MP OPTION BYTE | United Kingdom | C3 | 98 |
| | France/Swiss | 45 | 9A |
| | Western Europe (except UK) | 45 | 98 |
| | Eastern Europe | 41 | 58 |
| | Ireland (CII) | 43 | 98 |

| BYTE | BIT | LOW(0) | HIGH(1) | Remark |
|---|---|---|---|---|
| BYTE 0 | D7 | 3 BAND | UHF ONLY | HIGH (UK only) |
| | D6 | TV : NORMAL → ZOOM<br>A/ : NORMAL → ZOOM | TV : NORMAL → ZOOM → 16:9<br>A/V : NORMAL → ZOOM | MUST = HIGH |
| | D5 | MUST LOW | | POLAND OPTION<br>- R913 : 680Ω added<br>- J901 : delete |
| | D4 | CH Up/down functional in the A/V Mode (SCART Jack) | CH Up/down not functional in the A/V Mode (RCA Jack) | MUST = LOW |
| | D3 | NOT USED | | MUST = LOW |
| | D2 / D1 | (see table below) | | |
| | D0 | TDA8374A | TDA8842 | IC201 (ONE-CHIP) OPTION |
| BYTE 1 | D7 | | English/German/Dutch/Italian/Spnish/ Swedish/Croatian/Yugo/Greek/French | Western Europe (SZM-173EW/EW1) |
| | D6 | | English/Romanian/Hungarian/Polish/ Czech/Bulgarian | Eastern Europe (SZM-173EE) |
| | D5 | AFT ON (always) | AFT OFF (after fine tuning) | MUST = LOW |
| | D4 | Existing sharpness level : TDA6108 | Sharpness level up : TDA6107Q | MUST = HIGH |
| | D3 | No Auto Power On | Auto Power On | MUST = HIGH |
| | D2 | NTSC : 25 KHz (NTSC TABLE)<br>PAL : 50 KHz (PAL TABLE) | NTSC : 25KHz(NTSC TABLE)<br>PAL : 27KHz(NTSC TABLE) | |
| | D1 | PAL / SECAM | SECAM - L | - France/Swiss (only) : HIGH |
| | D0 | MUST : LOW | | |

| D2 | D1 | SOUND SYSTEM | COLOR SYSTEM | Destination |
|---|---|---|---|---|
| 0 | 0 | "?" → B/G ↔ D/K : CK MODEL | AUTO : NO OSD | Eastern Europe/France/Swiss |
| 0 | 1 | I ONLY ( NO OSD ) : CI,CII MDL | | United Kingdom |
| 1 | 0 | B/G ONLY (NO OSD ) : CB,CX MDL | | Western Europe |
| 1 | 1 | NOT USED | | |

● P-STD Classification ( CON./BRI./SHAR./COL )

| STANDARD MODE | DYNAMIC MODE | MOVIE MODE | MILD MODE | CUSTOM MODE |
|---|---|---|---|---|
| 90/50/50/50 | 100/50/75/50 | 90/50/75/50 | 60/50/50/50 | 90/50/50/50 |

● Function Required: 1. PICTURE OFF (after 15 minutes) during no signal. 2. AUDIO MUTE during no signal.
3. No BLUE SCREEN during no RF signal (Blue Screen during AV).
4. No TIMER. 5. No CHILD LOCK. 6. See "Detailed functions of CF".

## 4-2-4 C) NON-TTX MICOM (SZM-173ER) OPTION BYTE (FOR RUSSIA)

| Destination | BYTE 0 | BYTE 1 |
|---|---|---|
| Russia,CIS | 49 | 58 |
| Australia | 5D | 18 |
| India (CB MONO MODEL) | 5D | 38 |

<table>
<tr><th>BYTE</th><th>BIT</th><th>LOW(0)</th><th>HIGH(1)</th><th>Remark</th></tr>
<tr><td rowspan="8">BYTE 0</td><td>D7</td><td></td><td></td><td>MUST = LOW</td></tr>
<tr><td>D6</td><td>TV : NORMAL → ZOOM<br>A/V : NORMAL → ZOOM</td><td>TV : NORMAL → ZOOM → 16:9<br>A/V : NORMAL → ZOOM</td><td>MUST = HIGH</td></tr>
<tr><td>D5</td><td></td><td></td><td>MUST = LOW</td></tr>
<tr><td>D4</td><td>CH Up/down functional in the A/V Mode (SCART Jack)</td><td>CH Up/down not functional in the A/V Model (RCA Jack)</td><td></td></tr>
<tr><td>D3</td><td>PAL-I Used</td><td>PAL-I Not Used</td><td>MUST = HIGH</td></tr>
<tr><td>D2<br>D1</td><td colspan="2"><table>
<tr><th>D2</th><th>D1</th><th>SOUND SYSTEM</th><th>COLOR SYSTEM</th></tr>
<tr><td>0</td><td>0</td><td>"?" → B/G ↔ D/K : CK MODEL</td><td>AUTO : NO OSD</td></tr>
<tr><td>0</td><td>1</td><td>I ONLY (NO OSD ) : CI,CII MDL</td><td></td></tr>
<tr><td>1</td><td>0</td><td>B/G ONLY (NO OSD ) : CB,CX MDL</td><td></td></tr>
<tr><td>1</td><td>1</td><td>NOT USED</td><td></td></tr>
</table></td><td></td></tr>
<tr><td>D0</td><td>TDA8374A</td><td>TDA8842</td><td>IC201 (ONE-CHIP) OPTION</td></tr>
<tr><td rowspan="8">BYTE 1</td><td>D7</td><td></td><td></td><td>MUST = LOW</td></tr>
<tr><td>D6</td><td>English</td><td>English/Russian</td><td></td></tr>
<tr><td>D5</td><td>AFT ON (always)</td><td>AFT OFF (after fine tuning)</td><td>BASIC = LOW ( India HIGH )</td></tr>
<tr><td>D4</td><td>Existing sharpness level<br>(when using the TDA6108 RGB AMP)</td><td>Sharpness level up<br>(when using the TDA6107Q AMP)</td><td>MUST = HIGH</td></tr>
<tr><td>D3</td><td>No Auto Power On</td><td>Auto Power On</td><td>BASIC = HIGH</td></tr>
<tr><td>D2</td><td>NTSC: 25 KHz (NTSC TABLE)<br>PAL : 50 KHz (PAL TABLE)</td><td>NTSC : 25 KHz (NTSC TABLE)<br>PAL : 27 KHz (NTSC TABLE)</td><td></td></tr>
<tr><td>D1</td><td colspan="2" rowspan="2">NOT USED (MUST = LOW)</td><td rowspan="2"></td></tr>
<tr><td>D0</td></tr>
</table>

● P-STD Classification ( CON/BRI/SHAR/COL )

| STANDARD MODE | DYNAMIC MODE | MOVIE MODE | MILD MODE | CUSTOM MODE |
|---|---|---|---|---|
| 90/50/50/50 | 100/50/75/50 | 90/50/75/50 | 60/50/50/50 | 90/50/50/50 |

● Function Required : 1. PICTURE OFF (after 15 minutes) during no signal
2. AUDIO MUTE during no signal
3. BLUE SCREEN available
4. TIMER available
5. No CHILD LOCK

## 4-2-4 (D) NON-TTX MICOM (SZM-173AR/EA) OPTION BYTE (FOR MIDDLE EAST/AFRICA)

| | Destination | BYTE 0 | BYTE 1 |
|---|---|---|---|
| MP OPTION BYTE | Middle East (EA or AR) | 7F | 58 |
| | Africa (EA) | 67 | D8 |
| | GAME (Middle East) | 7F | 5A |

| BYTE | BIT | LOW (0) | HIGH (1) | Remark |
|---|---|---|---|---|
| BYTE 0 | D7 | | | MUST = LOW |
| | D6 | TV : NORMAL → ZOOM<br>A/V : NORMAL → ZOOM | TV : NORMAL → ZOOM → 16:9<br>A/V : NORMAL → ZOOM | MUST = HIGH |
| | D5 | NOT USED | CHILD LOCK ON | MUST = HIGH |
| | D4 | CH Up/down functional in the A/V Mode (SCART Jack) | CH Up/down not functional in the A/V Model (RCA Jack) | Middle East : HIGH<br>Africa : LOW |
| | D3 | Sound-I System Used | Sound-I System Not Used | |
| | D2, D1 | (see table below) | | |
| | D0 | TDA8374A | TDA8842 | IC201 (ONE-CHIP) OPTION |

| D2 | D1 | COLOR SYSTEM | SOUND SYSTEM |
|---|---|---|---|
| 0 | 0 | ● CK : AUTO (NO OSD ) | "?" → B/G → D/K |
| 0 | 1 | ● CW : -. RF : AUTO → PAL → SECAM → NT4.43<br>-. A/V : AUTO → PAL → SECAM → NT4.43 → NT3.58 | "?" → B/G → D/K → I |
| 1 | 0 | ● CB : - RF : PAL ONLY<br>- A/V : AUTO → PAL → NT4.43 → NT3.58 | B/G ONLY (NO OSD) |
| 1 | 1 | ● CS : -. RF : AUTO → PAL → SECAM → NT4.43 → NT3.58<br>-. A/V : AUTO → PAL → SECAM → NT4.43 → NT3.58 | "?" → B/G → D/K → I → NT- M → |

| BYTE | BIT | | | Remark |
|---|---|---|---|---|
| BYTE 1 | D7, D6 | (see table below) | | |
| | D5 | AFT ON (always) | AFT OFF after fine tuning | MUST = LOW |
| | D4 | Existing sharpness level (when using the TDA6108 RGB AMP) | Sharpness level up (when using the TDA6107Q RGB AMP) | MUST = HIGH |
| | D3 | No Auto Power On | Auto Power On | MUST = HIGH |
| | D2 | NTSC : 25 KHz (NTSC TABLE)<br>PAL : 50 KHz (PAL TABLE) | NTSC : 25 KHz (NTSC TABLE)<br>PAL : 27 KHz (NTSC TABLE) | |
| | D1 | Others | GAME | |
| | D0 | MUST = LOW | | |

| D7 | D6 | LANGUAGE | Remark |
|---|---|---|---|
| 0 | 0 | - | NOT USED |
| 0 | 1 | ENG / ARAB | Middle East |
| 1 | 0 | - | NOT USED |
| 1 | 1 | ENG / ARAB / FRENCH | EA VERSION (Africa ONLY) |

● Function Required : 1. PICTURE OFF (after 15 minutes) during no signal
2. AUDIO MUTE during no signal.
3. BLUE SCREEN ON/OFF
4. TIMER (CLOCK ON/OFF)
5. CHILD LOCK ON (always)

## 4-2-4 (E) NON-TTX MICOM (SZM-173EV/ET) OPTION BYTE (FOR ASIA)

| | DESTINATION | LINE-STREEO | | MONO(TV-OUT) | | MONO(MONO-OUT) | |
|---|---|---|---|---|---|---|---|
| | | BYTE 0 | BYTE 1 | BYTE 0 | BYTE 1 | BYTE 0 | BYTE 1 |
| OPTION - BYTE | Vietnam / Malaysia | DF | D8 | 5F | 58 | 5F | D8 |
| | Indonesia (CB MODEL CLOCK ON) | DD | DA | 5D | 5A | 5D | DA |
| | Thailand (CB MODEL) | – | | 5D | 58 | 5D | D8 |
| | India (CB MODEL AFT OFF) | DD | B8 | – | – | – | – |
| | India (CS MODEL AFT OFF) | DF | B8 | 5F | 38 | 5F | B8 |

| BYTE | BIT | LOW (0) | HIGH (1) | Remark |
|---|---|---|---|---|
| BYTE 0 | D7 | LINE STEREO OFF | LINE STEREO ON | SZM-173EV (only) |
| | D6 | TV : NORMAL → ZOOM<br>A/V : NORMAL → ZOOM | TV : NORMAL → ZOOM → 16:9<br>A/V : NORMAL → ZOOM | MUST = HIGH |
| | D5 | | | MUST = LOW |
| | D4 | CH Up/down functional in the A/V Mode (SCART Jack) | CH Up/down not functional in the A/V Mode (RCA Jack) | BASIC = HIGH |
| | D3 | Sound-I System Used | Sound-I System Not Used | |
| | D2<br>D1 | (see table below) | | |
| | D0 | TDA8374A | TDA8842 | IC201 (ONE-CHIP) OPTION |

| D2 | D1 | COLOR SYSTEM | SOUND SYSTEM | Destination |
|---|---|---|---|---|
| 0 | 0 | ● CK :AUTO (NO OSD) | "?" → B/G→ D/K | |
| 0 | 1 | ● CW : -. RF : AUTO → PAL → SECAM → NT4.43<br>-. A/V : AUTO → PAL → SECAM → NT4.43 → NT3.58 | "?" → B/G → D/K → I | |
| 1 | 0 | ● CB : - RF : PAL ONLY<br>- A/V : AUTO → PAL → NT4.43 → NT3.58 | B/G ONLY (NO OSD) | Indonesia/Thailand/ India |
| 1 | 1 | ● CS: - RF : AUTO → PAL → SECAM → NT4.43 → NT3.58<br>-A/V : AUTO → PAL → SECAM → NT4.43 → NT3.58 | "?" → B/G→ D/K → I<br>NT- M → | Vietnam Malaysia |

| BYTE | BIT | | | |
|---|---|---|---|---|
| BYTE 1 | D7 | TV OUT | MONITOR OUT | |
| | D6 | English ONLY | English/Vietnamese/Indonesian/Malay | SZM-173EV |
| | | | English/Thai | SZM-173ET |
| | D5 | AFT ON (always) | AFT OFF (after fine tuning) | |
| | D4 | Existing sharpness level (when using the TDA6108 RGB AMP) | Sharpness level up (when using the TDA6107Q RGB AMP) | MUST = HIGH |
| | D3 | No Auto Power On | Auto Power On | BASIC = HIGH |
| | D2 | NTSC : 25KHz (NTSC TABLE)<br>PAL : 50KHz (PAL TABLE) | NTSC : 25KHz (NTSC TABLE)<br>PAL : 27KHz (PAL TABLE) | MUST = LOW |
| | D1 | CLOCK DISPLAY OFF | CLOCK DISPLAY ON | Indonesia ONLY : HIGH |
| | D0 | MUST = LOW | | |

● Function Required : 1. PICTURE OFF (after 15 minutes) during no signal. 2. AUDIO MUTE during no signal.
3. BLUE SCREEN ON/OFF. 4. TIMER (CLOCK ON/OFF). 5. No CHILD LOCK

SZM -173ET (16K) : Z90203 → WITHOUT LINE STEREO
SZM -173EV (24K) : Z90234 → WITH LINE STEREO

## 4-2-4 (F) TTX MICOM (SZM-175EA/EP) OPTION BYTE (FOR MIDDLE EAST ASIA)

| MP OPTION BYTE | Destination | Application MICOM | BYTE0 | BYTE1 |
|---|---|---|---|---|
| | Iran (Persian TTX) | SPM-175EP | 1F | 1B |
| | Middle East (except Iran) | SPM-175EA | 1F | 1B |
| | Africa | | 07 | 1B |
| | Singapore | | 17 | 1B |

| BYTE | BIT | LOW (0) | HIGH (1) | Application MICOM |
|---|---|---|---|---|
| BYTE 0 | D7 | NOT USED | | ALL = LOW |
| | D6 | TV : NORMAL → ZOOM → 16:9<br>A/V : NORMAL → ZOOM | TV : NORMAL → ZOOM → 16:9<br>A/V : NORMAL → ZOOM → 16:9 | MUST = LOW |
| | D5 | NOT USED | | ALL = LOW |
| | D4 | CH Up/down functional in the A/V Mode (SCART Jack) | CH Up/down not functional in the A/V Mode (RCA Jack) | – Africa : SCART<br>– Others : RCA |
| | D3 | Sound-I System Used | Sound-I System Not Used | |
| | D2 | (see D2/D1 table below) | | |
| | D1 | | | |
| | D0 | TDA8374A | TDA 8842 | |

| D2 | D1 | COLOR SYSTEM | SOUND SYSTEM | Remark |
|---|---|---|---|---|
| 0 | 0 | ● CK : AUTO (NO OSD) | "?" → B/G → D/K | No sound system in the A/V MODE |
| 0 | 1 | ● CW : ■ RF : AUTO → PAL → SECAM → NT4.43<br>■ A/V : AUTO → PAL → SECAM → NT4.43 → NT3.58 | "?" → B/G → D/K → I → | |
| 1 | 0 | ● CB : ■ RF : PAL ONLY (NO OSD)<br>■ A/V : AUTO → PAL → NT4.43 → NT3.58 | B/G ONLY (NO OSD) | |
| 1 | 1 | ● CS : ■ RF : AUTO → PAL → SECAM → NT4.43 → NT3.58<br>■ A/V : AUTO → PAL → SECAM → NT4.43 → NT3.58 | "?" → B/G → D/K → I → NT → M → | |

| BYTE | BIT | LOW (0) | HIGH (1) | Application MICOM |
|---|---|---|---|---|
| BYTE 1 | D7 | NOT USED | | ALL (FIX = LOW) |
| | D6 | | | |
| | D5 | | | |
| | D4 | Existing sharpness level (when using the TDA6108 RGB AMP) | Sharpness level up (when using the TDA6107Q RGB AMP) | ALL (BASIC = HIGH) → TEST Unnecessary |
| | D3 | No Auto Power On | Auto Power On | ALL (BASIC = HIGH) |
| | D2 | NTSC : 25 KHz (NTSC TABLE)<br>PAL : 50 KHz (PAL TABLE) | NTSC : 25 KHz (NTSC TABLE)<br>PAL : 27 KHz (NTSC TABLE) | |
| | D1 | (see D1/D0 table below) | | MUST = HIGH |
| | D0 | | | |

| D1 D0 | 00 | 01 | 10 | 11 |
|---|---|---|---|---|
| | B/G | D/K | I | ? |

● OSD language by micom

1. Persian (for Iran) : SPM-175EP : English/Persian (Iranian)
2. Arab (Middle East, Africa) : SPM-175EA : English/French/Arabian

● Function Required : 1. PICTURE OFF (after 15 minutes) during no signal
2. AUDIO MUTE (during no signal)
3. No BLUE SCREEN
4. No TIMER
5. No CHILD LOCK

## 4-2-4 (G) TTX MICOM (SPM-175EE/ER/EG/EU) OPTION BYTE (FOR EUROPE)

| | Destination | Application MICOM | BYTE 0 | BYTE 1 | LANGUAGE |
|---|---|---|---|---|---|
| MP OPTION BYTE | United Kingdom (CI) | SPM-175EE | 83 | 18 | See BYTE 1 D5 |
| | Other Western Europe (CB) | | 05 | 18 | |
| | Eastern Europe (CK) | | 01 | 38 | |
| | Ireland (CII) | | 03 | 18 | |
| | France/Swiss | SPM-175EU | 05 | 58 | |
| | Yugo/Greece | SPM-175EG | 05 | 18 | English/Yugo/Greek |
| | Russia/Bulgaria | SPM-175ER | 01 | 19 | English/Russian/Bulgarian |

| BYTE | BIT | LOW(0) | HIGH(1) | Remark |
|---|---|---|---|---|
| BYTE 0 | D7 | 3 BAND | UHF DNLY (UK only) | |
| | D6 | TV : NORMAL → ZOOM → 16:9<br>A/V : NORMAL → ZOOM | TV : NORMAL → ZOOM → 16:9<br>A/V : NORMAL → ZOOM → 16:9 | |
| | D5 | MUST = LOW | <POLAND OPTION><br>R913 : 680Ω added. J901 : Delete | |
| | D4 | CH Up/Down functional in the A/V Mode (SCART Jack) | CH Up/Down not functional in the A/V Model (RCA Jack) | MUST = LOW |
| | D3 | P-STD NORMAL | P-STD MAX | MUST = LOW |
| | D2 / D1 | D2 D1 SOUND SYSTEM<br>0 0 "?" → B/G ↔ D/K : CK MODEL<br>0 1 I ONLY (NO OSD) : CI,CII MODEL<br>1 0 B/G ONLY (NO OSD): CB,CX MODEL<br>1 1 NOT USED | COLOR SYSTEM: AUTO (NO OSD) | Remark: No SOUND SYSTEM in the A/V Mode |
| | D0 | TDA8374A | TDA8842 | |
| BYTE 1 | D7 | NOT USED | | FIX = LOW |
| | D6 | PAL/SECAM | SECAM - L | HIGH (CF only) |
| | D5 | English/German/French/Dutch/ Italian/Spanish/Swedish | English/Croatian/Romanian/ Hungarian/Polish/Czech | This bit is only applied to SPM-175EE |
| | D4 | Existing sharpness level (when using the TDA6108 RGB AMP) | Sharpness level up (when using the TDA6107Q AMP) | ALL BASIC = HIGH<br>→ TEST Unnecessary |
| | D3 | No Auto Power On | Auto Power On | ALL BASIC = HIGH |
| | D2 | NTSC : 25KHz (NTSC TABLE)<br>PAL : 50KHz (PAL TABLE) | NTSC : 25KHz (NTSC TABLE)<br>PAL : 27KHz (NTSC TABLE) | ALL (RF VOL. CURVE) BASIC = LOW |
| | D1 | MUST = LOW | | |
| | D0 | B/G | D/K | 175ER is only applied (Others = LOW) |

● P-STD Classification (CON/BRI/SHRP/COL)

| D3 BIT | STANDARD MODE | DYNAMIC MODE | MOVIE MODE | MILD MODE | CUSTOM MODE |
|---|---|---|---|---|---|
| 0 | 90/50/50/50 | 100/50/50/50 | 75/55/50/50 | 60/50/50/50 | 90/55/25/50 |

● Function Required :1. PICTURE OFF (after 15 minutes) during no signal. 2. AUDIO MUTE (during no signal).
3. No BLUE SCREEN. 4. No TIMER (CLOCK /OFF). 5. No CHILD LOCK

### 4-2-5 RESET

The Reset Mode is used during factory inspection.
Function Reset:

| | | |
|---|---|---|
| 1. | Channels | Add/Erase |
| 2. | Sort | Non |
| 3. | System | Auto |
| 4. | Timer | off |
| 5. | Blue Screen | off |
| 6. | Child Lock | off |
| 7. | Picture | standard |
| 8. | Volume | 10 |
| 9. | CH. Skip | Erased |

## 4-3 Other Adjustments

### 4-3-1 General

1. Usually, a color TV needs only slight touch-up adjustment upon installation. Check the basic characteristics such as height, horizontal and vertical sync and focus.

2. The picture should have good black and white details. There should be no objectionable color shading; if color shading is present, perform the purity and convergence adjustments described below.

3. Use the specified test equipment or its equivalent.

4. Correct impedance matching is essential.

5. Avoid overload. Excessive signal from a sweep generator might overload the front-end of the TV. When inserting signal markers, do not allow the marker generator to distort test results.

6. Connect the TV only to an AC power source with voltage and frequency as specified on the backcover nameplate.

7. Do not attempt to connect or disconnect any wires while the TV is turned on. Make sure that the power cord is disconnected before replacing any parts.

8. To protect against shock hazard, use an isolation transformer.

### 4-3-2 Automatic Degaussing

A degaussing coil is mounted around the picture tube, so that external degaussing after moving the TV should be unnecessary. But the receiver must be properly degaussed upon installation.

The degaussing coil operates for about 1 second after the power is switched ON. If the set has been moved or turned in a different direction, disconnect its AC power for at least 30 minutes.

If the chassis or parts of the cabinet become magnetized, poor color purity will result. If this happens, use an external degaussing coil. Slowly move the degaussing coil around the faceplate of the picture tube and the sides and front of the receiver. Slowly withdraw the coil to a distance of about 6 feet before removing power.

### 4-3-3 High Voltage Check

CAUTION: There is no high voltage adjustment on this chassis. The B+ power supply must be set to +125 volts (Full color bar input and normal picture level).

1. Connect a digital voltmeter to the second anode of the picture tube.
2. Turn on the TV. Set the Brightness and Contrast controls to minimum (zero beam current).
3. The high voltage should not exceed 27.5KV.
4. Adjust the Brightness and contrast controls to both extremes. Ensure that the high voltage does not exceed 27.5KV under any conditions.

### 4-3-4 FOCUS Adjustment

1. Input a black and white signal.
2. Adjust the tuning control for the clearest picture.
3. Adjust the FOCUS control for well defined scanning lines in the center area of the screen.

### 4-3-5 Cathode Voltage Adjustment (Screen Adjustment)

1. Connect CRT socket pin GK to an oscilloscope probe.
2. Input a gray scale pattern. (Use a pattern generator, PM5518)
3. Use the P mode key (on the remote control) for the STANDARD picture.
4. Adjust the Screen VR (on the FBT) so that the voltage on the oscilloscope becomes 130±2.5V (See Fig. 4-1).

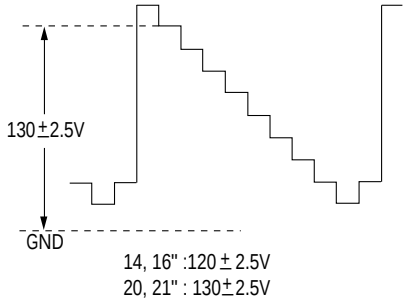



Fig. 4-1

### 4-3-6 Purity Adjustment

1. Warm up the receiver for at least 20 minutes.
2. Plug in the CRT deflection yoke and tighten the clamp screw.
3. Plug the convergence yoke into the CRT and set in as shown in Fig. 4-2.
4. Input a black and white signal.
5. Fully demagnetize the receiver by applying an external degaussing coil.
6. Turn the CONTRAST and BRIGHTNESS controls to maximum.
7. Loosen the clamp screw holding the yoke. Slide the yoke backward or forward to provide vertical green belt. (Fig. 4-3).
8. Tighten the convergence yoke.
9. Slowly move the deflection yoke forward, and adjust for the best overall green screen.
10. Temporarily tighten the deflection yoke.
11. Produce blue and red rasters by adjusting the low-light controls. Check for good purity in each field.
12. Tighten the deflection yoke.

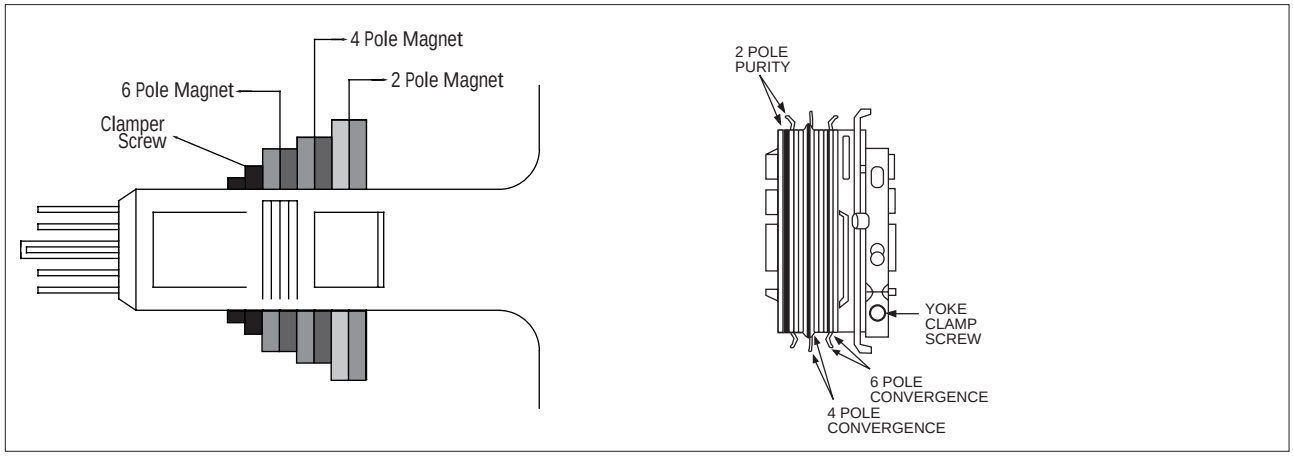



Fig. 4-2 Convergence Magnet Assembly

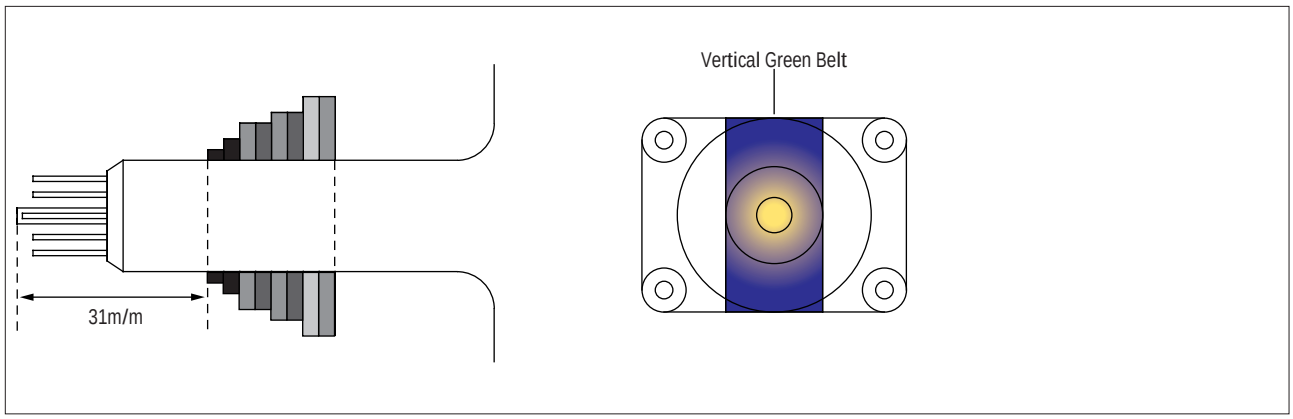



Fig. 4-3 Center Convergence Adjustment

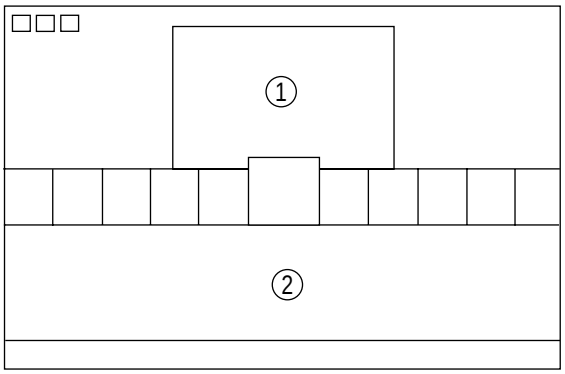



Fig. 4-4

### 4-3-7 White Balance Adjustment

(a) Set up

1. Warm up the TV for at least 30 minutes in the Aging Mode (OSD White). This mode is displayed by entering the following sequence:

   SLEEP →FACTORY → FACTORY

2. Input a Toshiba pattern.

(b) Low-Light Adjustment

1. Set SBT to 1.3 ± 0.2 fL in the Factory Service Mode with using CA100. See Fig. 4-4 ②.

2. Adjust RG,BG so that the levels are suitable to each local area.

(c) High-Light Adjustment

1. Set SCT to 55 FL (20". 21"), 65 FL(14".16") in the Factory Service Mode with using CA100. See Fig. 4-4 ①.

## 4-3-8 Center Convergence Adjustment

1. Warm up the receiver for at least 20 minutes.
2. Adjust the two tabs of the 4 pole magnets to change the angle between them. Superimpose the red and blue vertical lines in the center area of the screen.
3. Adjust the Brightness and Contrast controls for a well defined picture.
4. Adjust the two-tab pairs of the 4 pole magnets, and change the angle between them. Superimpose the red and the blue vertical lines in the center area of the screen.
5. Turn the both tabs at the same time, keeping the angle constant, and superimpose the red and blue horizontal line in the center of the screen.
6. Adjust the two-tab pairs of the 6-pole magnets to superimpose the red and blue line onto the green. (Changing the angle affects the vertical lines, and rotating both magnets affects the horizontal lines.)
7. Repeat adjustments 2~6, if necessary.
8. Since the 4-pole magnets and 6-pole magnets interact, the dot movement is complex (Fig. 4-5).

Fig. 4-5 Center Convergence Adjustment

## 4-3-9 VCO Adjustment

Set the vco data to 80 (Factory Mode).
NOTE : For SZM-173EW and SPM-175E (Western Europe remote control), set the VCO data to 1.

### 4-3-10 RF AGC Adjustment

Set the AGC data to 14 (Factory Mode).

### 4-3-11 Sub-Color Adjustment

Set SCR data to 10 (Factory Mode).

### 4-3-12 Geometry Adjustment

SC →PVA→PVS→ PSL →PHS

1. Input a lion head pattern (in the PAL channel).
2. Set the SC (S-Correction) as follows : 12 (21″), 10 (20″), 0 (14″,16″) and PVA 40 so that the lion head circle becomes oval.
3. Adjust with PVS (Vertical shift) so that the top margin of the picture is 4.

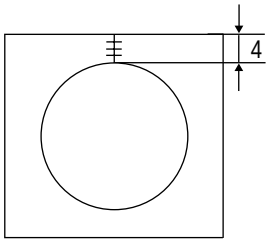



Fig. 4-7

4. Adjust with PSL (Vertical-Slope) so that the bottom margin of the picture is 4.

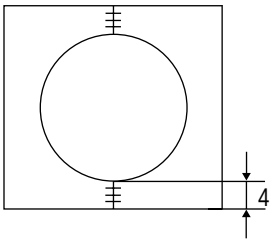



Fig. 4-8

5. Adjust with PHS (Horizontal Shift) so that the lion-head pattern and CRT centers are aligned.

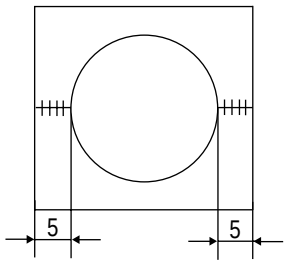


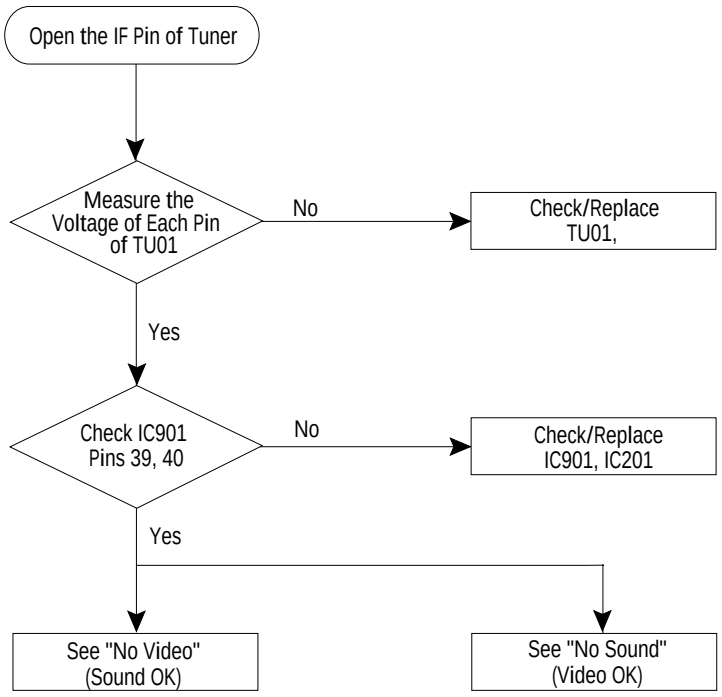

Fig. 4-9

6. Adjust PHS (using the width coil) so that the left and right margins of the picture are 5.

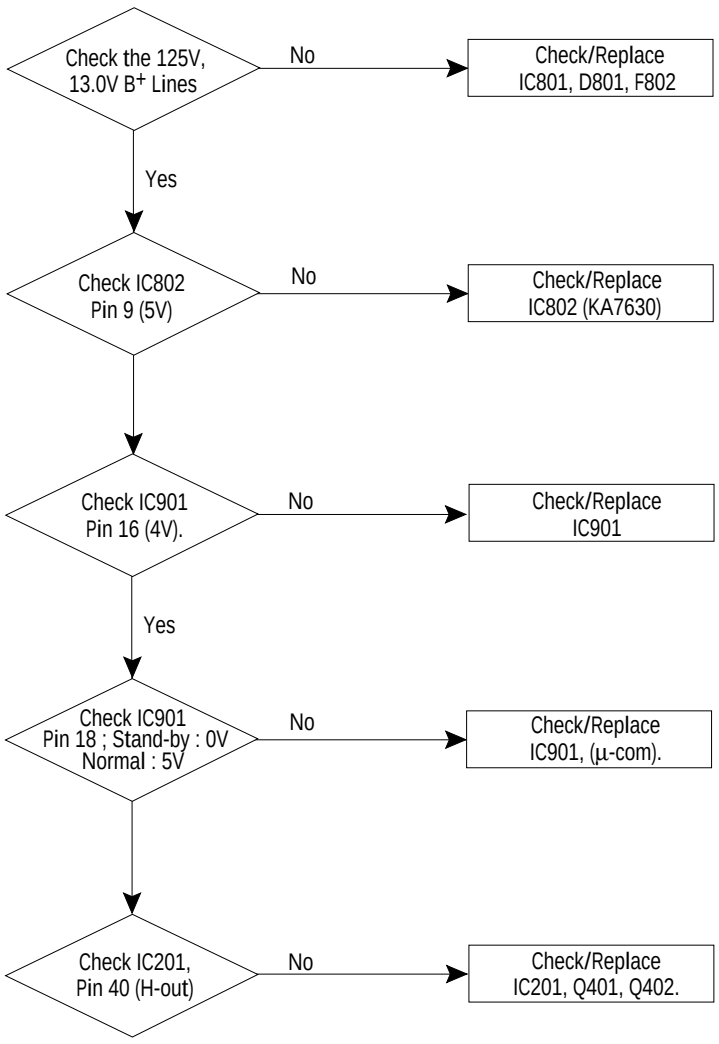
# MEMO

# 5. Troubleshooting

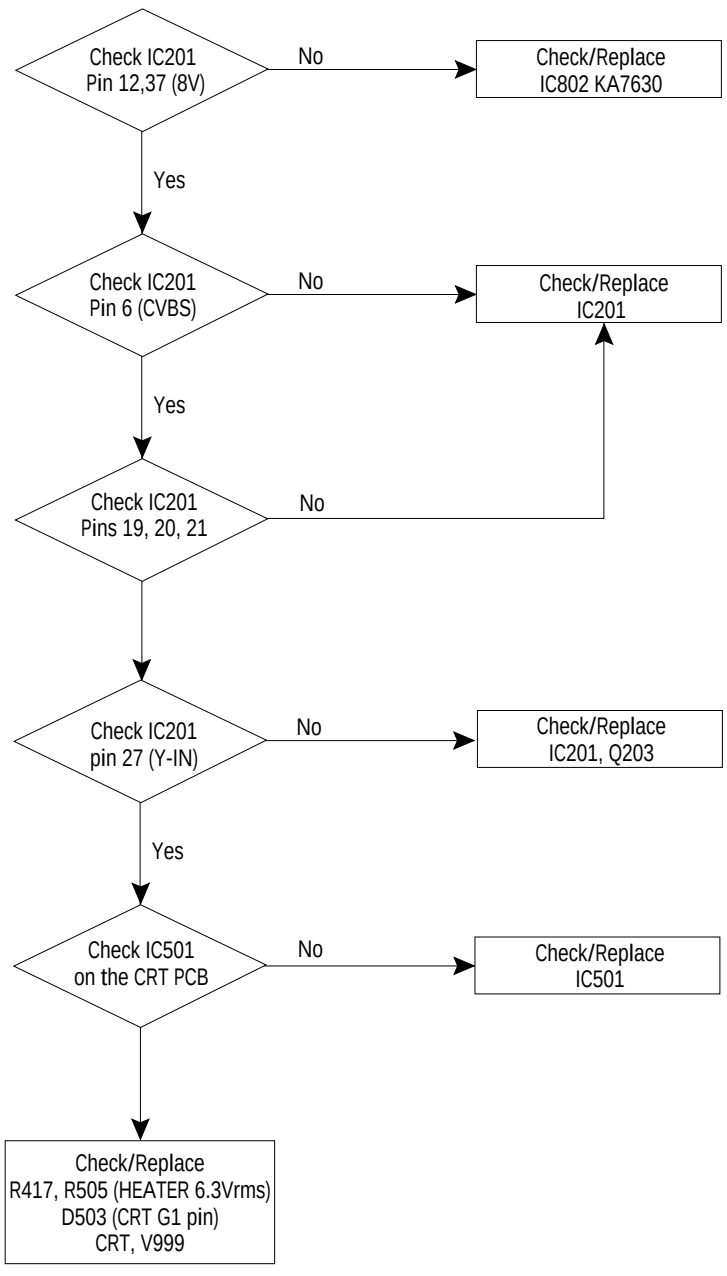
## 5-1 No Video (Raster On, No Sound)



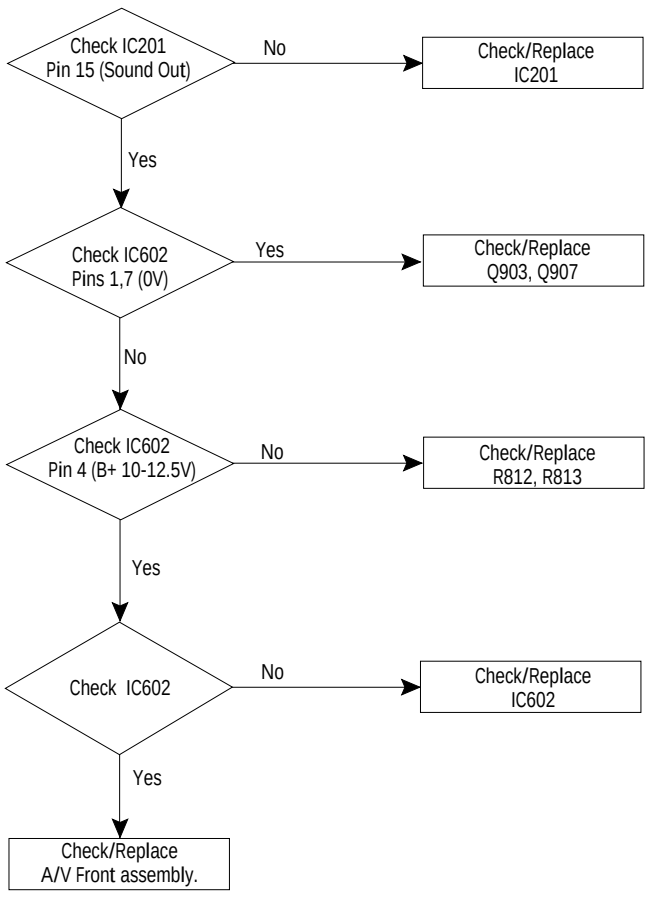
## 5-2 No Power


Check the 125V, 13.0V B+ Lines
No
Check/Replace IC801, D801, F802
Yes
Check IC802 Pin 9 (5V)
No
Check/Replace IC802 (KA7630)
Check IC901 Pin 16 (4V).
No
Check/Replace IC901
Yes
Check IC901 Pin 18 ; Stand-by : 0V Normal : 5V
No
Check/Replace IC901, (μ-com).
Check IC201, Pin 40 (H-out)
No
Check/Replace IC201, Q401, Q402.

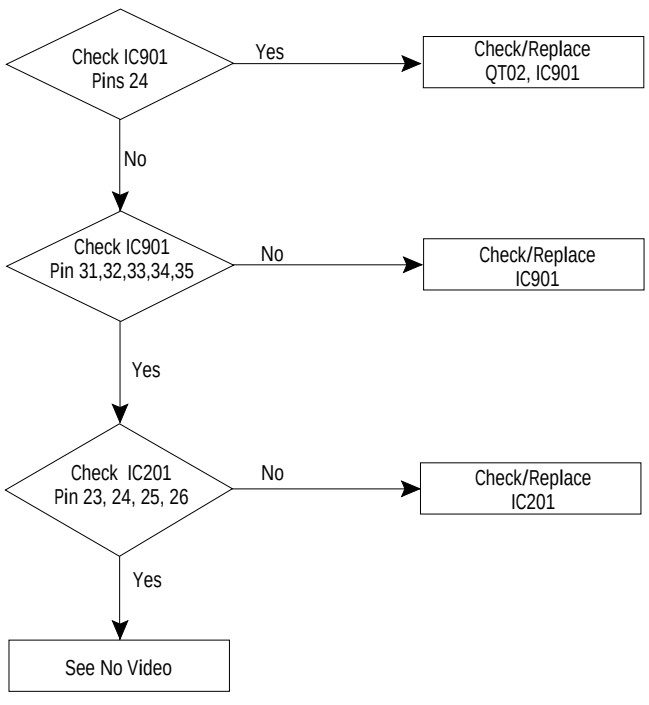
## 5-3 No Video (Sound OK)



## 5-4 No Sound (Video OK)

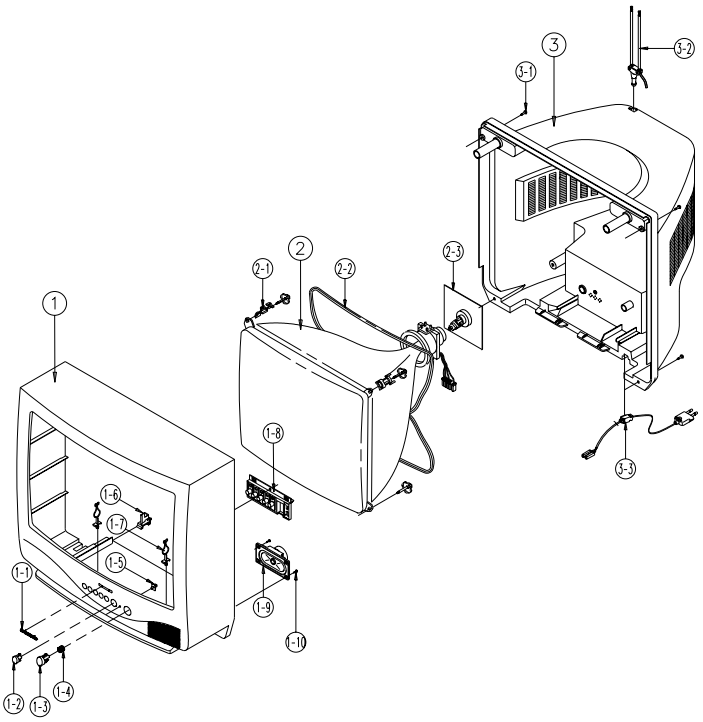



## 5-5 No TTX



# 6. Exploded View & Parts List

## 6-1 CK331FVR5X/BWT




| No | Code No | Description | Specification | Q'ty | Remark |
|---|---|---|---|---|---|
| 1 | AA91-10358G | ASSY-CABINET,FRONT | -,CK331FVR,BK708P BWT TVI NEW, | 1 | |
| | AA64-31095K | CABINET-FRONT | -,CK331FVR,BK708P BWT TVI NEW, | 1 | |
| 1-1 | AA64-70009F | BADGE-BRAND | AL,SS R800 22,SILVER,L40,-,-,- | 1 | |
| 1-2 | AA64-40450A | WINDOW-RMC | -,501F,-,ABS,HB,LG-41338,- | 1 | |
| 1-3 | AA64-10704C | KNOB-POWER | -,501F,-,ABS,HB,BLK | 1 | |
| 1-4 | AA61-60003Q | SPRING-CS | -,SUS304,0.5,OD8,H10,N5,-,-,- | 1 | |
| 1-5 | AA64-40451A | INDICATOR-LED | -,501F,-,ABS,HB,-,- | 1 | |
| 1-6 | AA61-40007A | STOPPER-PCB | 5038.5368,ABS HB,NTR,-,-,- | 1 | |
| 1-7 | AA65-30105A | CLAMP-WIRE | NYLON 66,V2,NTR,15MM,ALL MODEL | 1 | |
| 1-8 | AA64-10705A | KNOB-CONTROL | -,501F,-,ABS,HB,BLK | 1 | |
| 1-9 | 3001-000275 | SPEAKER | 2.5W,16ohm,90dB,105Hz | 1 | |
| 1-10 | 6002-000514 | SCREW-TAPPING | RH,+,2,M4,L15,ZPC(BLK),SWRCH18 | 2 | |
| 2 | AA03-10001D | CRT-COLOR | -,A34KQV42X,+380MG,14,90DEG,5 | 1 | |
| 2-1 | AA65-30106A | CLAMP-D,COIL | NYLON 66,V2,NTR,-,14 INCH,- | 2 | |
| 2-2 | AA27-20003U | COIL-DEGAUSSING | -,14,16.4ohm,75T,890mm,D | 1 | |
| 2-3 | 3704-001089 | SOCKET-CRT | 7P,22.5PI,12PI,SN,- | 1 | |
| 3 | AA64-31096B | CABINET-BACK | -,331F,-,HIPS,V2,BLK,-,- | 1 | |
| 3-1 | 6002-000514 | SCREW-TAPPING | RH,+,2,M4,L15,ZPC(BLK),SWRCH18 | 4 | |
| 3-2 | AA42-10001V | ANT-ROD | -,3S,620mm,BRN,UL/CSA | 1 | |
| 3-3 | AA61-20284A | HOLDER | -,P-CORD,PP,VO,BLK,KE-002 | 1 | |

# 7. Electric Parts List

## 7-1 CK501FVR5S/NWT (CK331FVR5X AND CK501FVR5S Dissimilar Parts)

| Loc. No. | Code No. | Description ; Specification | Remark |
|---|---|---|---|
| | | **ASSY-PCB,MAIN(OPT)** | |
| | | BUYER : SRSC | |
| * | AA94-00408A | ASSY-PCB,MAIN(OPT);CK501FVR5S/NWT,S15A,N-RUSSIA,- | |
| C307 | 2305-000708 | C-FILM,MPEF;150nF,5%,100V,TP,16.5x10.3x5.7 | |
| C409 | 2306-000253 | C-FILM,MPPF;7.2nF,5%,1.6KV,TP,28.5x18.5x12 | |
| C410 | 2201-000406 | C-CERAMIC,DISC;270pF,10%,2KV,Y5P,TP,8x6,7.5 | |
| C416 | 2306-000195 | C-FILM,MPPF;360nF,5%,400V,TP,26x19x11.5,20 | |
| C916 | 2301-000445 | C-FILM,PEF;4.7nF,5%,50V,TP,5.5x7x3mm,5mm | |
| CN501 | AA39-20109B | LEAD-CONNECTOR,ASSY;-,YBNH025-08,S,8P,500,1007#26 | |
| CN802 | AA27-20003Y | COIL-DEGAUSSING;-,20,15.2ohm,28T,L2170,E | |
| L401 | AA27-30001B | COIL-LINEARITY;-,195uH,QIC1010,PI0.4,4.5x21.5 | |
| R302 | 2008-001033 | R-FUSIBLE(S);10ohm,5%,2W,AF,TP,3.9x10mm | |
| R305 | 2004-001370 | R-METAL(S);1.3ohm,1%,1/2W,AA,TP,2.4x6.4mm | |
| R405 | 2001-001410 | R-CARBON(S);43OHM,5%,1/2W,AA,TP,- | |
| R417 | 2008-000265 | R-FUSIBLE(S);1ohm,5%,2W,AA,TP,3.9x10mm | |
| R501H | 2002-001008 | R-COMPOSITION;1.8Kohm,5%,1/2W,AA,TP,3.7x9mm | |
| R502H | 2002-001008 | R-COMPOSITION;1.8Kohm,5%,1/2W,AA,TP,3.7x9mm | |
| R505 | 2008-001011 | R-FUSIBLE(S);0.18ohm,10%,2W,AF,TP,3.9x10mm | |
| R611 | 2001-000577 | R-CARBON;2KOHM,5%,1/8W,AA,TP,- | |
| R814 | 2008-000267 | R-FUSIBLE(S);2.4ohm,5%,2W,AA,TP,3.9x10mm | |
| R815 | 2008-000267 | R-FUSIBLE(S);2.4ohm,5%,2W,AA,TP,3.9x10mm | |
| ⚠ T444 | AA26-30001Y | TRANS-FLYBACK;-,FSV-20A001,20,125V | |
| ⚠ V999 | 3704-001090 | SOCKET-CRT;9P,15.24PI,26.5PI,SN,- | |
| | | **ASSY-CRT** | |
| ⚠ | AA03-10029W | CRT-COLOR;-,A48KRD82X(H),+380mG,20,90de | |
| | AA27-00002A | MAGNET-CONVERGENCE;-,JH291-SC-OB,29.1MM | |
| ⚠ | AA27-50004W | DEFLECTION-YOKE;-,DSE-1992LL(1H),20"/A48KRD82X | |
| | | **ASSY-SPEAKER** | |
| | 3001-000003 | SPEAKER;3W,16ohm,88+-2dB,180+-36Hz | |
| | AA39-20501C | LEAD CONNECTOR-ASSY;-,67096-003,REC,3(2)P,700mm,10 | |

| Loc. No. | Code No. | Description ; Specification | Remark |
|---|---|---|---|
| | | **ASSY-ACCESSORY** | |
| | AA68-11289A | MANUAL-USERS;S15A,N-RUSSIA,W/O TTX,B5,W/P 1 | |
| | | **ASSY-CABINET;501F,CK501FVR5S/NWT** | |
| * | AA91-10389C | ASSY-CABINET,FRONT;DP,CK501FVR,BK708P MLN TVI (SPK) | |
| | AA64-31093M | CABINET-FRONT;-,CK501FVR,BK708P BWT TVI,HIPS | |
| | AA64-31218B | CABINET-BACK;DP,501F,AA64-31094B,-,V2,-,-,- | |
| | AA64-10759A | KNOB-CONTROL;DP,501F,AA64-10705A,-,-,- | |
| CRT+CF | AA60-10050Q | SCREW-ASSY;WC,HH,+,M5,L26.5,SWRCH18A,ZPC( | |
| D-COIL | AA65-30107A | CLAMP-D,COIL;NYLON 66,V2,NTR,-,20~22 INCH,- | |
| | AA61-40053A | STOPPER-PCB;ALL MODEL,HIPS HB,WHT,HB,-,- | |
| | AA64-70015A | BADGE-BRAND;AL,SS R2000 22,SILVER,L45,-,- | |
| SPK+CF | 6002-000514 | SCREW-TAPPING;RH,+,2,M4,L15,ZPC(BLK),SWRCH18 | |

# 7-2 CK331FVR5X/BWT P arts List

| Loc. No. | Code No. | Description ; Specification | Remark |
|---|---|---|---|
| | | **ASSY-PCB,MAIN(OPT)** | |
| | | BUYER : SRSC | |
| * | AA94-10136E | ASSY-PCB,MAIN(OPT);CK331FVR5X/BWT,S15A,RUSSIA,- | |
| * | AA94-00404A | ASSY-PCB,MAIN(OPT);CK331FVR5S/NWT,S15A,N-RUSSIA,- | |
| * | AA94-00418A | ASSY-PCB,MAIN(OPT);CK331FVR5X/VWT,S15A,LITHUANIA | |
| C101 | 2401-000030 | C-AL;22uF,20%,25V,GP,TP,5x11,5 | |
| C102 | 2401-001082 | C-AL;330nF,20%,50V,GP,TP,5x11,5 | |
| C103 | 2401-001363 | C-AL;470uF,20%,16V,GP,TP,10x12.5,5 | |
| C201 | 2306-000122 | C-FILM,MPPF;100nF,5%,50V,TP,7.3x4.0x5.0mm, | |
| C202 | 2401-001840 | C-AL;100uF,20%,16V,GP,TP,6.3x11,5 | |
| C203 | 2401-000660 | C-AL;2.2uF,20%,50V,GP,TP,5x11,5 | |
| C204 | 2401-000603 | C-AL;1uF,20%,50V,GP,TP,5x11,5 | |
| C205 | 2305-000411 | C-FILM,MPEF;470nF,5%,50V,TP,7.3x4.8x5.5mm, | |
| C206 | 2305-000411 | C-FILM,MPEF;470nF,5%,50V,TP,7.3x4.8x5.5mm, | |
| C207 | 2305-000196 | C-FILM,MPEF;150nF,5%,63V,TP,-,5mm | |
| C208 | 2401-000027 | C-AL;4.7uF,20%,50V,GP,TP,5x11,5 | |
| C209 | 2202-000849 | C-CERAMIC,MLC-AXIAL;18pF,5%,50V,CH,TP,3.5x1.9,- | |
| C210 | 2301-000445 | C-FILM,PEF;4.7nF,5%,50V,TP,5.5x7x3mm,5mm | |
| C211 | 2305-000665 | C-FILM,MPEF;100nF,5%,63V,TP,7.5x4.0x5.0mm, | |
| C212 | 2202-000796 | C-CERAMIC,MLC-AXIAL;1NF,10%,50V,Y5P,TP,3.5X1.9MM,- | |
| C213 | 2201-000273 | C-CERAMIC,DISC;18pF,5%,50V,CH,TP,5x3mm,5 | |
| C214 | 2301-000356 | C-FILM,PEF;47nF,5%,50V,TP,7.5x4.0x6.5,5mm | |
| C215 | 2301-000383 | C-FILM,PEF;10nF,5%,50V,TP,6x7x3.2mm,5mm | |
| C216 | 2305-000289 | C-FILM,MPEF;220nF,5%,63V,TP,-,5mm | |
| C217 | 2301-000192 | C-FILM,PEF;1nF,5%,50V,TP,5.3x10mm,5mm | |
| C219 | 2401-000603 | C-AL;1uF,20%,50V,GP,TP,5x11,5 | |
| C221 | 2202-000121 | C-CERAMIC,MLC-AXIAL;100pF,10%,50V,Y5P,TP,1.9x3.5,- | |
| C222 | 2401-000480 | C-AL;10uF,20%,50V,GP,TP,5x11,5 | |
| C224 | 2202-000295 | C-CERAMIC,MLC-AXIAL;68pF,5%,50V,SL,TP,3.5x19,- | |
| C226 | 2301-000224 | C-FILM,PEF;22nF,5%,50V,TP,7.4x3.9x13mm,5m | |
| C228 | 2201-000247 | C-CERAMIC,DISC;15pF,5%,50V,CH,TP,5x3,5 | |
| C230 | 2401-002144 | C-AL;47uF,20%,16V,GP,TP,5x11,5 | |
| C231 | 2401-000480 | C-AL;10uF,20%,50V,GP,TP,5x11,5 | |
| C232 | 2401-001840 | C-AL;100uF,20%,16V,GP,TP,6.3x11,5 | |
| C238 | 2401-002144 | C-AL;47uF,20%,16V,GP,TP,5x11,5 | |
| C239 | 2305-000289 | C-FILM,MPEF;220nF,5%,63V,TP,-,5mm | |
| C240 | 2305-000665 | C-FILM,MPEF;100nF,5%,63V,TP,7.5x4.0x5.0mm, | |
| C247 | 2202-002037 | C-CERAMIC,MLC-AXIAL;100nF,80-20%,50V,Y5V,TP,2.2x3. | |
| C248 | 2309-000138 | C-FILM,PE-PPF;100nF,5%,50V,TP,20x16x8.5,7.5m | |
| C249 | 2401-000603 | C-AL;1uF,20%,50V,GP,TP,5x11,5 | |
| C250 | 2301-000224 | C-FILM,PEF;22nF,5%,50V,TP,7.4x3.9x13mm,5m | |
| C251 | 2301-000204 | C-FILM,PEF;2.7nF,5%,50V,TP,7.4x3.9x13mm,5 | |
| C252 | 2301-000192 | C-FILM,PEF;1nF,5%,50V,TP,5.3x10mm,5mm | |
| C253 | 2306-000122 | C-FILM,MPPF;100nF,5%,50V,TP,7.3x4.0x5.0mm, | |
| C254 | 2306-000122 | C-FILM,MPPF;100nF,5%,50V,TP,7.3x4.0x5.0mm, | |
| C255 | 2306-000122 | C-FILM,MPPF;100nF,5%,50V,TP,7.3x4.0x5.0mm, | |
| C301 | 2202-000253 | C-CERAMIC,MLC-AXIAL;4.7nF,20%,16V,Y5R,TP,1.9x3.5,7 | |
| C302 | 2202-000253 | C-CERAMIC,MLC-AXIAL;4.7nF,20%,16V,Y5R,TP,1.9x3.5,7 | |
| C303 | 2401-003028 | C-AL;100uF,20%,25V,WT,TP,6.3x11,5 | |
| C304 | 2401-000903 | C-AL;22uF,20%,160V,WT,TP,10x20mm,5m | |
| C305 | 2305-000178 | C-FILM,MPEF;10nF,5%,100V,TP,-,5mm | |
| C306 | 2305-000285 | C-FILM,MPEF;220NF,5%,100V,TP,10.5X5.5X15MM,5 | |
| C307 | 2305-000149 | C-FILM,MPEF;100nF,5%,100V,TP,12x12.5x6.5,5 | |
| C308 | 2305-000450 | C-FILM,MPEF;56nF,5%,100V,TP,-,5mm | |
| C401 | 2301-000383 | C-FILM,PEF;10nF,5%,50V,TP,6x7x3.2mm,5mm | |
| C402 | 2201-000599 | C-CERAMIC,DISC;560pF,10%,500V,Y5P,TP,7x4,5 | |
| C403 | 2201-000556 | C-CERAMIC,DISC;470pF,10%,500V,Y5P,TP,7x4,5 | |
| C404 | 2401-001998 | C-AL;1000uF,20%,25V,GP,TP,10x20,5mm | |
| C408 | 2401-002619 | C-AL;47uF,20%,25V,GP,TP,5x11,5 | |
| C409 | 2301-001219 | C-FILM,MPE-PPF;3.9nF,5%,1.6KV,TP,29x8.5x15,20 | |
| C410 | 2201-000467 | C-CERAMIC,DISC;330pF,10%,2KV,Y5P,TP,8x6,7.5 | |
| C411 | 2401-000927 | C-AL;22uF,20%,250V,GP,TP,13x20,5 | |
| C413 | 2305-000382 | C-FILM,MPEF;4.7nF,5%,400V,TP,-,5mm | |
| C414 | 2301-001065 | C-FILM,MPPF;47nF,5%,630V,TP,19x15.5x7,7.5 | |
| C415 | 2401-000560 | C-AL;1uF,20%,160V,GP,TP,6.3x11,5 | |
| C416 | 2306-001004 | C-FILM,MPPF;300nF,5%,400V,TP,26x14x21mm,20 | |
| C417 | 2201-000556 | C-CERAMIC,DISC;470pF,10%,500V,Y5P,TP,7x4,5 | |
| C418 | 2401-000384 | C-AL;10uF,20%,100V,GP,TP,6.3x11,5mm | |
| C419 | 2201-000984 | C-CERAMIC,DISC;680pF,10%,2KV,Y5P,TP,11x6,7.5m | |
| C502 | 2301-000213 | C-FILM,PEF;220nF,5%,250V,TP,21.5x11,7.5 | |
| C503 | 2201-002063 | C-CERAMIC,DISC;10nF,+80-20%,3KV,Y5V,TP,16x5,7 | |
| C504 | 2401-001232 | C-AL;4.7uF,20%,250V,GP,TP,10x12.5,5 | |
| C506 | 2401-000430 | C-AL;10uF,20%,250V,GP,TP,10x16mm,5m | |
| C601 | 2202-000210 | C-CERAMIC,MLC-AXIAL;270pF,10%,50V,Y5P,TP,1.9x3.5,7 | |
| C602 | 2401-000030 | C-AL;22uF,20%,25V,GP,TP,5x11,5 | |
| C603 | 2301-000445 | C-FILM,PEF;4.7nF,5%,50V,TP,5.5x7x3mm,5mm | |
| C604 | 2401-001323 | C-AL;470nF,20%,50V,BP,TP,5x11,5mm | |
| C610 | 2401-001998 | C-AL;1000uF,20%,25V,GP,TP,10x20,5mm | |
| C613 | 2202-000796 | C-CERAMIC,MLC-AXIAL;1NF,10%,50V,Y5P,TP,3.5X1.9MM,- | |
| C614 | 2202-000210 | C-CERAMIC,MLC-AXIAL;270pF,10%,50V,Y5P,TP,1.9x3.5,7 | |
| C702 | 2202-000263 | C-CERAMIC,MLC-AXIAL;470pF,10%,50V,Y5P,TP,3.5x19,- | |
| C704 | 2202-000121 | C-CERAMIC,MLC-AXIAL;100pF,10%,50V,Y5P,TP,1.9x3.5,- | |
| C705 | 2401-001989 | C-AL;4.7uF,20%,50V,BP,TP,5x11,5 | |
| C706 | 2401-001989 | C-AL;4.7uF,20%,50V,BP,TP,5x11,5 | |
| C800 | 2306-000321 | C-FILM,MPPF;470NF,5%,275V,TP,-,22.5 | |
| C801 | 2401-002213 | C-AL;150uF,+30-10%,450V,GP,BK,25x35 | |
| C802 | 2401-001192 | C-AL;33uF,20%,50V,GP,TP,6.3x11,5 | |
| C803 | 2301-000224 | C-FILM,PEF;22nF,5%,50V,TP,7.4x3.9x13mm,5m | |
| C804 | 2301-000310 | C-FILM,PEF;68nF,5%,50V,TP,8.0X8.5X4.0X5,5 | |
| C805 | 2303-000163 | C-FILM,PPF;2.2nF,5%,800V,TP,15x13x8.5,7.5 | |
| C806 | 2201-000446 | C-CERAMIC,DISC;3.3nF,20%,400V,Y5U,TP,18x8,10m | |
| C807 | 2201-000991 | C-CERAMIC,DISC;560pF,10%,2KV,Y5P,TP,13x7,7.5 | |
| C808 | 2401-000262 | C-AL;100uF,20%,160V,HR,TP,16x25,7.5 | |
| C809 | 2401-002290 | C-AL;47uF,20%,160V,GP,TP,13x20,5 | |
| C810 | 2201-000991 | C-CERAMIC,DISC;560pF,10%,2KV,Y5P,TP,13x7,7.5 | |
| C811 | 2401-003141 | C-AL;2200uF,20%,25V,WT,TP,13x25,5mm | |
| C814 | 2301-000192 | C-FILM,PEF;1nF,5%,50V,TP,5.3x10mm,5mm | |
| C815 | 2401-002594 | C-AL;220uF,20%,16V,GP,TP,8x11.5,5 | |
| C816 | 2401-000603 | C-AL;1uF,20%,50V,GP,TP,5x11,5 | |
| C818 | 2401-002144 | C-AL;47uF,20%,16V,GP,TP,5x11,5 | |
| C819 | 2401-001840 | C-AL;100uF,20%,16V,GP,TP,6.3x11,5 | |
| C901 | 2401-001840 | C-AL;100uF,20%,16V,GP,TP,6.3x11,5 | |
| C902 | 2202-000796 | C-CERAMIC,MLC-AXIAL;1NF,10%,50V,Y5P,TP,3.5X1.9MM,- | |
| C904 | 2202-000796 | C-CERAMIC,MLC-AXIAL;1NF,10%,50V,Y5P,TP,3.5X1.9MM,- | |
| C905 | 2401-001333 | C-AL;470nF,20%,50V,GP,TP,5x11,5 | |
| C907 | 2201-000119 | C-CERAMIC,DISC;100nF,+80-20%,50V,Y5V,TP,8x3.5 | |
| C908 | 2201-000193 | C-CERAMIC,DISC;10pF,0.3pF,50V,CH,TP,5x3,5 | |
| C909 | 2201-000193 | C-CERAMIC,DISC;10pF,0.3pF,50V,CH,TP,5x3,5 | |
| C910 | 2306-000122 | C-FILM,MPPF;100nF,5%,50V,TP,7.3x4.0x5.0mm, | |
| C911 | 2401-002235 | C-AL;10uF,20%,16V,GP,TP,5x11mm,5mm | |
| C912 | 2201-000234 | C-CERAMIC,DISC;150pF,5%,50V,CH,TP,9.5x3,5 | |
| C913 | 2301-000108 | C-FILM,PEF;1.5nF,5%,50V,TP,6.5x3.0x5.5mm, | |
| C914 | 2306-000122 | C-FILM,MPPF;100nF,5%,50V,TP,7.3x4.0x5.0mm, | |
| C915 | 2306-000122 | C-FILM,MPPF;100nF,5%,50V,TP,7.3x4.0x5.0mm, | |
| C916 | 2301-000192 | C-FILM,PEF;1nF,5%,50V,TP,5.3x10mm,5mm | |
| C917 | 2202-002037 | C-CERAMIC,MLC-AXIAL;100nF,80-20%,50V,Y5V,TP,2.2x3. | |
| C919 | 2202-000796 | C-CERAMIC,MLC-AXIAL;1NF,10%,50V,Y5P,TP,3.5X1.9MM,- | |
| C920 | 2401-000480 | C-AL;10uF,20%,50V,GP,TP,5x11,5 | |
| C922 | 2201-000573 | C-CERAMIC,DISC;47pF,5%,50V,CH,TP,6.5x3.0,5 | |
| C923 | 2202-002037 | C-CERAMIC,MLC-AXIAL;100nF,80-20%,50V,Y5V,TP,2.2x3. | |
| C924 | 2202-002037 | C-CERAMIC,MLC-AXIAL;100nF,80-20%,50V,Y5V,TP,2.2x3. | |
| C926 | 2202-000796 | C-CERAMIC,MLC-AXIAL;1NF,10%,50V,Y5P,TP,3.5X1.9MM,- | |
| C927 | 2201-000573 | C-CERAMIC,DISC;47pF,5%,50V,CH,TP,6.5x3.0,5 | |
| CA01 | 2401-001989 | C-AL;4.7uF,20%,50V,BP,TP,5x11,5 | |
| CN501 | AA39-20109A | LEAD-CONNECTOR,ASSY;-,YBNH025-08,S,8P,400,1007#26 | |
| CN601 | 3711-002642 | CONNECTOR-HEADER;BOX,3P,1R,2.5mm,STRAIGHT,SN | |
| CN802 | AA27-20003U | COIL-DEGAUSSING;-,14,16.4ohm,75T,890mm,D | |
| CW901 | 2503-000156 | C-NETWORK;100pFx4,20%,50V | |
| D201 | 0401-000005 | DIODE-SWITCHING;1N4148,75V,200MA,DO-35,TP | |
| D202 | 0401-000005 | DIODE-SWITCHING;1N4148,75V,200MA,DO-35,TP | |
| D205 | 0401-000005 | DIODE-SWITCHING;1N4148,75V,200MA,DO-35,TP | |
| D208 | 2001-000633 | R-CARBON;30KOHM,5%,1/8W,AA,TP,- | |
| D209 | 0401-000005 | DIODE-SWITCHING;1N4148,75V,200MA,DO-35,TP | |
| D210 | 0401-000005 | DIODE-SWITCHING;1N4148,75V,200MA,DO-35,TP | |
| D211 | 0401-000005 | DIODE-SWITCHING;1N4148,75V,200MA,DO-35,TP | |
| D213 | 0401-000005 | DIODE-SWITCHING;1N4148,75V,200MA,DO-35,TP | |
| D401 | 0402-000132 | DIODE-RECTIFIER;1N4004,400V,1A,DO-41,TP | |
| D402 | 0402-000132 | DIODE-RECTIFIER;1N4004,400V,1A,DO-41,TP | |
| D403 | 0402-001105 | DIODE-RECTIFIER;ERB43-04SV1,400V,1.0A,-,TP | |
| D404 | 0402-000534 | DIODE-RECTIFIER;RG10V,400V,1.2A,DO-201,TP | |
| D405 | 0402-001105 | DIODE-RECTIFIER;ERB43-04SV1,400V,1.0A,-,TP | |
| D406 | 0402-001105 | DIODE-RECTIFIER;ERB43-04SV1,400V,1.0A,-,TP | |
| D501 | 0402-000216 | DIODE-RECTIFIER;ERC24-06,600V,1.0A,DO-204 | |

| Loc. No. | Code No. | Description ; Specification | Remark |
|---|---|---|---|
| D502 | 0402-001105 | DIODE-RECTIFIER;ERB43-04SV1,400V,1.0A,-,TP | |
| D503 | 0402-001105 | DIODE-RECTIFIER;ERB43-04SV1,400V,1.0A,-,TP | |
| D504 | 0402-001105 | DIODE-RECTIFIER;ERB43-04SV1,400V,1.0A,-,TP | |
| D701 | 0401-000005 | DIODE-SWITCHING;1N4148,75V,200MA,DO-35,TP | |
| D800 | 1405-000187 | VARISTOR;750V,1250A,12.5x7mm,TP | |
| D801 | 0402-000102 | DIODE-BRIDGE;D2SB60,600V,1.5A,- | |
| D802 | 0402-000540 | DIODE-RECTIFIER;RU20A,600V,1.5A,-,TP | |
| D804 | 0402-000213 | DIODE-RECTIFIER;ERB12-06,600V,1.0A,DO-41,TP | |
| D805 | 0402-000534 | DIODE-RECTIFIER;RG10V,400V,1.2A,DO-201,TP | |
| D809 | 0401-000005 | DIODE-SWITCHING;1N4148,75V,200MA,DO-35,TP | |
| D810 | 0402-000216 | DIODE-RECTIFIER;ERC24-06,600V,1.0A,DO-204 | |
| D901 | 0401-000005 | DIODE-SWITCHING;1N4148,75V,200MA,DO-35,TP | |
| D903 | 0401-000005 | DIODE-SWITCHING;1N4148,75V,200MA,DO-35,TP | |
| D905 | 0401-000005 | DIODE-SWITCHING;1N4148,75V,200MA,DO-35,TP | |
| D906 | 0401-000005 | DIODE-SWITCHING;1N4148,75V,200MA,DO-35,TP | |
| D907 | 0401-000005 | DIODE-SWITCHING;1N4148,75V,200MA,DO-35,TP | |
| D908 | 0401-000005 | DIODE-SWITCHING;1N4148,75V,200MA,DO-35,TP | |
| D910 | 2001-000734 | R-CARBON;4.7KOHM,5%,1/8W,AA,TP,- | |
| DA01 | 0401-000005 | DIODE-SWITCHING;1N4148,75V,200MA,DO-35,TP | |
| DZ201 | 0403-000355 | DIODE-ZENER;UZ5.1BSB,5.1V,4.97-5.18V,500mW | |
| DZ202 | 0403-000551 | DIODE-ZENER;MTZ3.9B,3.9V,3.89-4.16V,500mW, | |
| DZ203 | 0403-000563 | DIODE-ZENER;MTZ9.1B,9.1V,8.57-9.01V,500mW, | |
| DZ204 | 2001-000812 | R-CARBON;5.6KOHM,5%,1/8W,AA,TP,- | |
| DZ205 | 0403-000563 | DIODE-ZENER;MTZ9.1B,9.1V,8.57-9.01V,500mW, | |
| DZ208 | 0403-000563 | DIODE-ZENER;MTZ9.1B,9.1V,8.57-9.01V,500mW, | |
| DZ301 | 0403-000660 | DIODE-ZENER;MTZ22A,22V,20.15-21.2V,500mW,D | |
| DZ302 | 0403-001039 | DIODE-ZENER;MA2560,56V,52-60V,1W,DO-41,TP | |
| DZ401 | 0403-000296 | DIODE-ZENER;MTZ5.6B,5.6V,5.45-5.73V,500mW, | |
| DZ501 | 0403-000563 | DIODE-ZENER;MTZ9.1B,9.1V,8.57-9.01V,500mW, | |
| DZ502 | 0403-000563 | DIODE-ZENER;MTZ9.1B,9.1V,8.57-9.01V,500mW, | |
| DZ503 | 0403-000563 | DIODE-ZENER;MTZ9.1B,9.1V,8.57-9.01V,500mW, | |
| DZ504 | 0403-000563 | DIODE-ZENER;MTZ9.1B,9.1V,8.57-9.01V,500mW, | |
| DZ701 | 0403-000563 | DIODE-ZENER;MTZ9.1B,9.1V,8.57-9.01V,500mW, | |
| DZ702 | 0403-000563 | DIODE-ZENER;MTZ9.1B,9.1V,8.57-9.01V,500mW, | |
| DZ703 | 0403-000563 | DIODE-ZENER;MTZ9.1B,9.1V,8.57-9.01V,500mW, | |
| DZ704 | 0403-000563 | DIODE-ZENER;MTZ9.1B,9.1V,8.57-9.01V,500mW, | |
| DZ705 | 0403-000563 | DIODE-ZENER;MTZ9.1B,9.1V,8.57-9.01V,500mW, | |
| DZ802 | 0403-000297 | DIODE-ZENER;MTZ6.2B,6.2V,5.96-6.27V,500mW, | |
| DZ803 | 1203-001217 | IC-POSI.ADJUST REG.;431,TO-92,3P,4.58MIL,PLASTIC,2 | |
| DZ804 | 2001-001170 | R-CARBON(S);6.8OHM,5%,1/2W,AA,TP,- | |
| DZ808 | 0403-000300 | DIODE-ZENER;MTZ8.2B,8.2V,7.78-8.19V,500mW, | |
| DZ809 | 0403-000296 | DIODE-ZENER;MTZ5.6B,5.6V,5.45-5.73V,500mW, | |
| DZ901 | 0403-000563 | DIODE-ZENER;MTZ9.1B,9.1V,8.57-9.01V,500mW, | |
| DZ903 | 1203-000451 | IC-VOLTAGE REGULATOR;33,TO-92,3P,-,PLASTIC,31/35V,2 | |
| DZ905 | 0403-000296 | DIODE-ZENER;MTZ5.6B,5.6V,5.45-5.73V,500mW, | |
| DZ907 | 0403-000296 | DIODE-ZENER;MTZ5.6B,5.6V,5.45-5.73V,500mW, | |
| DZ909 | 0403-000551 | DIODE-ZENER;MTZ3.9B,3.9V,3.89-4.16V,500mW, | |
| ⚠ F801 | 3601-000261 | FUSE-FERRULE;250V,3.15A,TL,GLASS,5.2x20mm | |
| F801A | 3602-000114 | FUSE-HOLDER;-,-,30mohm | |
| F801B | 3602-000114 | FUSE-HOLDER;-,-,30mohm | |
| ⚠ F802 | 3601-001086 | FUSE-FERRULE;125V,5A,FA,GLASS,2.4x7.5mm | |
| ⚠ IC201 | 1204-001440 | IC-VIDEO SYSTEM;TDA8842,DIP,56P,300MIL,PLASTIC | |
| ⚠ IC301 | 1204-000441 | IC-IF CIRCUIT;TDA8356,SIP,9P,-,PLASTIC,40V,- | |
| ⚠ IC501 | 1201-001159 | IC-VIDEO AMP;6107,ZIP,9P,300MIL,SINGLE,-,PL | |
| ⚠ IC601 | 1201-001147 | IC-AUDIO AMP;7056B,SIP,9P,-,SINGLE,41.5dB,P | |
| ⚠ IC801 | 1203-001494 | IC-PWM CONTROLLER;3S0680RF,TO3PF-5L,5,210,PLASTI | |
| ⚠ IC802 | 1203-001531 | IC-POSI.FIXED REG.;7630,SIP,10P,-,PLASTIC,5.1/8V, | |
| ⚠ IC901 | AA13-30021J | IC-MCU;-,Z90233-R3943,8BIT,SDIP,CS-53 | |
| ⚠ IC902 | 1103-001105 | IC-EEPROM;24C040,4Kx1BIT,DIP,8P,300MIL,1 | |
| J185 | 2701-000114 | INDUCTOR-AXIAL;10uH,10%,2.5x3.4mm | |
| JS701 | 3722-000183 | JACK-SCART;21P,4mm,SN,BLK,NO | |
| L102 | 2701-000212 | INDUCTOR-AXIAL;68uH,10%,2.8x7mm | |
| L103 | 2701-000114 | INDUCTOR-AXIAL;10uH,10%,2.5x3.4mm | |
| L202 | 2701-000168 | INDUCTOR-AXIAL;3.3uH,5%,2.5x3.4mm | |
| L206 | 2701-000114 | INDUCTOR-AXIAL;10uH,10%,2.5x3.4mm | |
| L301 | 2701-000114 | INDUCTOR-AXIAL;10uH,10%,2.5x3.4mm | |
| L302 | 2701-000114 | INDUCTOR-AXIAL;10uH,10%,2.5x3.4mm | |
| L304 | 2701-000159 | INDUCTOR-AXIAL;22uH,10%,4.2x9.8mm | |
| L305 | 2701-000116 | INDUCTOR-AXIAL;10uH,10%,4.2x9.8mm | |
| L306 | 2701-000115 | INDUCTOR-AXIAL;10uH,10%,2.8x7mm | |
| L401 | AA27-30003R | COIL-LINERITY;-,220uH,YL10x10,0.35mm,23x13mm | |
| L402 | 2901-000297 | FILTER-EMI ON BOARD;-,3A,-,-,3.5x5,TP,- | |
| L601 | 2701-000146 | INDUCTOR-AXIAL;2.2uH,10%,2.5x3.4mm | |
| L702 | 2701-000184 | INDUCTOR-AXIAL;4.7uH,10%,2.5x3.4mm | |
| L703 | 2701-000184 | INDUCTOR-AXIAL;4.7uH,10%,2.5x3.4mm | |
| L704 | 2701-000184 | INDUCTOR-AXIAL;4.7uH,10%,2.5x3.4mm | |
| L706 | 2701-000184 | INDUCTOR-AXIAL;4.7uH,10%,2.5x3.4mm | |

| Loc. No. | Code No. | Description ; Specification | Remark |
|---|---|---|---|
| L801 | AA29-30001B | FILTER-LINE;-,27mH,-,-,- | |
| L804 | 3301-000287 | CORE-FERRITE BEAD;AA,3.5x1.0x6.0mm,1500,2400G | |
| L805 | 2901-000297 | FILTER-EMI ON BOARD;-,3A,-,-,3.5x5,TP,- | |
| L807 | 2901-000297 | FILTER-EMI ON BOARD;-,3A,-,-,3.5x5,TP,- | |
| L809 | 2701-001032 | INDUCTOR-AXIAL;100uH,10%,5x14mm | |
| L810 | 2701-001032 | INDUCTOR-AXIAL;100uH,10%,5x14mm | |
| L902 | 2701-000189 | INDUCTOR-AXIAL;470nH,10%,2.5x3.4mm | |
| L904 | 2701-000299 | INDUCTOR-AXIAL;13uH,10%,2.5x3.4mm | |
| LD901 | AA96-30007A | ASSY-LED,GUIDE;-,AA61-50055A,DL-G7GA,GREEN | |
| NT801 | 1404-001075 | THERMISTOR-NTC;5ohm,15%,-,17mW/C,TP | |
| P801 | 1404-001048 | THERMISTOR-PTC;7ohm,30%,200/220V,270V,19A,-,B | |
| PC801 | 0604-001038 | PHOTO-COUPLER;TR,130-260%,200mW,DIP-4,ST | |
| Q201 | 0501-002183 | TR-SMALL SIGNAL;KTC9014,NPN,625mW,TO-92,TP,100 | |
| Q202 | 0501-002183 | TR-SMALL SIGNAL;KTC9014,NPN,625mW,TO-92,TP,100 | |
| Q204 | 0501-002183 | TR-SMALL SIGNAL;KTC9014,NPN,625mW,TO-92,TP,100 | |
| ⚠ Q401 | 0502-001115 | TR-POWER;KSC5386,NPN,50W,TO-3PF,ST,8- | |
| ⚠ Q402 | 0501-000369 | TR-SMALL SIGNAL;KSC2331-Y,NPN,1W,TO-92L,-,120- | |
| Q701 | 0501-002183 | TR-SMALL SIGNAL;KTC9014,NPN,625mW,TO-92,TP,100 | |
| Q703 | 0501-000283 | TR-SMALL SIGNAL;KSA539,PNP,400mW,TO-92,TP,120- | |
| Q901 | 0501-002183 | TR-SMALL SIGNAL;KTC9014,NPN,625mW,TO-92,TP,100 | |
| Q902 | 0501-002183 | TR-SMALL SIGNAL;KTC9014,NPN,625mW,TO-92,TP,100 | |
| Q903 | 0501-002183 | TR-SMALL SIGNAL;KTC9014,NPN,625mW,TO-92,TP,100 | |
| Q904 | 0504-000123 | TR-DIGITAL;KSR1010,NPN,300mW,10K,TO-92,TP | |
| Q905 | 0504-000123 | TR-DIGITAL;KSR1010,NPN,300mW,10K,TO-92,TP | |
| Q906 | 0504-000123 | TR-DIGITAL;KSR1010,NPN,300mW,10K,TO-92,TP | |
| Q907 | 0504-000125 | TR-DIGITAL;KSR1012,NPN,300mW,47K,TO-92,TP | |
| Q908 | 0504-000123 | TR-DIGITAL;KSR1010,NPN,300mW,10K,TO-92,TP | |
| QA01 | 0501-002183 | TR-SMALL SIGNAL;KTC9014,NPN,625mW,TO-92,TP,100 | |
| R200 | 2001-000780 | R-CARBON;470OHM,5%,1/8W,AA,TP,- | |
| R201 | 2001-000005 | R-CARBON;390OHM,5%,1/8W,AA,TP,- | |
| R202 | 2001-000281 | R-CARBON;100OHM,5%,1/8W,AA,TP,- | |
| R203 | 2001-000281 | R-CARBON;100OHM,5%,1/8W,AA,TP,- | |
| R204 | 2001-000281 | R-CARBON;100OHM,5%,1/8W,AA,TP,- | |
| R207 | 2001-000008 | R-CARBON;15KOHM,5%,1/8W,AA,TP,- | |
| R208 | 2001-000005 | R-CARBON;390OHM,5%,1/8W,AA,TP,- | |
| R209 | 2701-000114 | INDUCTOR-AXIAL;10uH,10%,2.5x3.4mm | |
| R210 | 2001-000429 | R-CARBON;1KOHM,5%,1/8W,AA,TP,- | |
| R211 | 2001-000331 | R-CARBON;12KOHM,5%,1/8W,AA,TP,- | |
| R212 | 2001-000281 | R-CARBON;100OHM,5%,1/8W,AA,TP,- | |
| R213 | 2001-000281 | R-CARBON;100OHM,5%,1/8W,AA,TP,- | |
| R214 | 2001-000281 | R-CARBON;100OHM,5%,1/8W,AA,TP,- | |
| R215 | 2001-001015 | R-CARBON;9.1KOHM,5%,1/8W,AA,TP,- | |
| R216 | 2001-000490 | R-CARBON;200OHM,5%,1/8W,AA,TP,- | |
| R217 | 2001-000449 | R-CARBON;2.2KOHM,5%,1/8W,AA,TP,- | |
| R218 | 2001-000591 | R-CARBON;3.3KOHM,5%,1/8W,AA,TP,- | |
| R219 | 2001-000008 | R-CARBON;15KOHM,5%,1/8W,AA,TP,- | |
| R221 | 2001-000290 | R-CARBON;10KOHM,5%,1/8W,AA,TP,- | |
| R223 | 2001-000938 | R-CARBON;68OHM,5%,1/8W,AA,TP,- | |
| R224 | 2001-000563 | R-CARBON;27KOHM,5%,1/8W,AA,TP,- | |
| R225 | 2001-000554 | R-CARBON;270OHM,5%,1/8W,AA,TP,- | |
| R226 | 2001-000281 | R-CARBON;100OHM,5%,1/8W,AA,TP,- | |
| R227 | 2004-001234 | R-METAL;75Kohm,5%,1/8W,AA,TP,1.8x3.2mm | |
| R229 | 2001-000890 | R-CARBON;6.8KOHM,5%,1/8W,AA,TP,- | |
| R230 | 2001-000793 | R-CARBON;47OHM,5%,1/8W,AA,TP,- | |
| R231 | 2001-000563 | R-CARBON;27KOHM,5%,1/8W,AA,TP,- | |
| R232 | 2001-000356 | R-CARBON;150KOHM,5%,1/8W,AA,TP,- | |
| R234 | 2001-000281 | R-CARBON;100OHM,5%,1/8W,AA,TP,- | |
| R236 | 2003-000634 | R-METAL OXIDE(S);3.9Kohm,5%,1W,AA,TP,3.3x9mm | |
| R237 | 2001-000793 | R-CARBON;47OHM,5%,1/8W,AA,TP,- | |
| R240 | 2001-000832 | R-CARBON;510OHM,5%,1/8W,AA,TP,- | |
| R241 | 2001-000734 | R-CARBON;4.7KOHM,5%,1/8W,AA,TP,- | |
| R242 | 2001-000734 | R-CARBON;4.7KOHM,5%,1/8W,AA,TP,- | |
| R251 | 2001-000429 | R-CARBON;1KOHM,5%,1/8W,AA,TP,- | |
| R252 | 2004-001914 | R-METAL;39Kohm,2%,1/8W,AA,TP,1.8x3.5mm | |
| R262 | 2001-000429 | R-CARBON;1KOHM,5%,1/8W,AA,TP,- | |
| R301 | 2004-001983 | R-METAL(S);2.49Kohm,1%,1/2W,AA,TP,2.4x6.4 | |
| R302 | 2003-002010 | R-METAL OXIDE(S);680ohm,5%,1W,AF,TP,3.9x10mm | |
| R303 | 2001-000273 | R-CARBON;100KOHM,5%,1/8W,AA,TP,- | |
| R305 | 2004-004087 | R-METAL(S);1.5ohm,1%,1/2W,AA,TP,2.5x6.5mm | |
| R306 | 2008-000254 | R-FUSIBLE(S);0.68ohm,5%,2W,AF,TP,3.9x10mm | |
| R307 | 2003-000649 | R-METAL OXIDE(S);330ohm,5%,1W,AF,TP,3.3x9mm | |
| R402 | 2003-000664 | R-METAL OXIDE(S);33ohm,5%,2W,AF,TP,4x12mm | |
| R403 | 2001-001114 | R-CARBON(S);270OHM,5%,1/2W,AA,TP,- | |
| R404 | 2008-000294 | R-FUSIBLE(S);33ohm,5%,2W,AF,TP,3.9x10mm | |
| R405 | 2001-000117 | R-CARBON(S);68OHM,5%,1/2W,AA,TP,- | |
| R406 | 2001-000037 | R-CARBON(S);330OHM,5%,1/2W,AA,TP,- | |
| R407 | 2001-001037 | R-CARBON(S);0.39OHM,5%,1/2W,AA,TP,- | |

| Loc. No. | Code No. | Description ; Specification | Remark |
|---|---|---|---|
| R408 | 2001-000022 | R-CARBON(S);33OHM,5%,1/2W,AA,TP,- | |
| R409 | 2008-000204 | R-FUSIBLE(S);0.22ohm,10%,1/2W,AF,TP,2.5x6.5 | |
| R412 | 2003-000664 | R-METAL OXIDE(S);33ohm,5%,2W,AF,TP,4x12mm | |
| R413 | 2003-000784 | R-METAL OXIDE(S);7.5Kohm,5%,2W,AF,TP,4x12mm | |
| R414 | 2003-000540 | R-METAL OXIDE(S);1Kohm,5%,2W,AF,TP,4x12mm | |
| R415 | 2008-000206 | R-FUSIBLE(S);1ohm,5%,1/2W,AF,TP,2.5x6.5mm | |
| R416 | 2008-000277 | R-FUSIBLE;68ohm,5%,1/2W,AA,TP,4.7x11mm | |
| R417 | 2008-000256 | R-FUSIBLE(S);1.5ohm,5%,2W,AA,TP,3.9x10mm | |
| R420 | 2004-001377 | R-METAL(S);120Kohm,1%,1/2W,AA,TP,2.4x6.4m | |
| R501M | 2002-001008 | R-COMPOSITION;1.8Kohm,5%,1/2W,AA,TP,3.7x9mm | |
| R502M | 2002-001008 | R-COMPOSITION;1.8Kohm,5%,1/2W,AA,TP,3.7x9mm | |
| R503 | 2002-001008 | R-COMPOSITION;1.8Kohm,5%,1/2W,AA,TP,3.7x9mm | |
| R504 | 2001-001062 | R-CARBON(S);10MOHM,5%,1/2W,AA,TP,- | |
| R505 | 2008-000266 | R-FUSIBLE(S);1ohm,5%,2W,AF,TP,3.9x10mm | |
| R510 | 2001-000281 | R-CARBON;100OHM,5%,1/8W,AA,TP,- | |
| R511 | 2001-000281 | R-CARBON;100OHM,5%,1/8W,AA,TP,- | |
| R512 | 2001-000281 | R-CARBON;100OHM,5%,1/8W,AA,TP,- | |
| R603 | 2001-000241 | R-CARBON;1.5KOHM,5%,1/8W,AA,TP,- | |
| R604 | 2001-000734 | R-CARBON;4.7KOHM,5%,1/8W,AA,TP,- | |
| R610 | 2001-000347 | R-CARBON;13KOHM,5%,1/8W,AA,TP,- | |
| R611 | 2001-000258 | R-CARBON;1.8KOHM,5%,1/8W,AA,TP,- | |
| R701 | 2001-000281 | R-CARBON;100OHM,5%,1/8W,AA,TP,- | |
| R702 | 2001-000969 | R-CARBON;75OHM,5%,1/8W,AA,TP,- | |
| R703 | 2001-000429 | R-CARBON;1KOHM,5%,1/8W,AA,TP,- | |
| R705 | 2001-000003 | R-CARBON;330OHM,5%,1/8W,AA,TP,- | |
| R713 | 2001-000812 | R-CARBON;5.6KOHM,5%,1/8W,AA,TP,- | |
| R714 | 2001-000429 | R-CARBON;1KOHM,5%,1/8W,AA,TP,- | |
| R715 | 2001-000812 | R-CARBON;5.6KOHM,5%,1/8W,AA,TP,- | |
| R717 | 2001-000812 | R-CARBON;5.6KOHM,5%,1/8W,AA,TP,- | |
| R801 | 2003-000994 | R-METAL OXIDE(S);33Kohm,5%,2W,AF,TP,3.9x10mm | |
| R802 | 2003-000994 | R-METAL OXIDE(S);33Kohm,5%,2W,AF,TP,3.9x10mm | |
| R803 | 2001-001178 | R-CARBON(S);680OHM,5%,1/2W,AA,TP,- | |
| R805 | 2003-001023 | R-METAL OXIDE(S);120ohm,0.05,2W,AF,TP,3.9x10mm | |
| R806 | 2002-001011 | R-COMPOSITION;3.3Mohm,10%,1/2W,AA,TP,3.7x9mm | |
| R807 | 2002-001011 | R-COMPOSITION;3.3Mohm,10%,1/2W,AA,TP,3.7x9mm | |
| R808 | 2001-000022 | R-CARBON(S);33OHM,5%,1/2W,AA,TP,- | |
| R809 | 2001-000622 | R-CARBON;300KOHM,5%,1/8W,AA,TP,- | |
| R810 | 2003-000527 | R-METAL OXIDE(S);18Kohm,5%,2W,AA,TP,4x12mm | |
| R812 | 2003-000455 | R-METAL OXIDE(S);100ohm,5%,2W,AA,TP,4x12mm | |
| R814 | 2008-000271 | R-FUSIBLE(S);3.3ohm,5%,2W,AA,TP,3.9x10mm | |
| R815 | 2008-000271 | R-FUSIBLE(S);3.3ohm,5%,2W,AA,TP,3.9x10mm | |
| R816 | 2004-004089 | R-METAL(S);123Kohm,1%,1/2W,AA,TP,2.5x6.5m | |
| R817 | 2004-001983 | R-METAL(S);2.49Kohm,1%,1/2W,AA,TP,2.4x6.4 | |
| R818 | 2004-001371 | R-METAL(S);1.5Kohm,1%,1/2W,AA,TP,2.4x6.4m | |
| R819 | 2004-001390 | R-METAL(S);1Kohm,2%,1/2W,AA,TP,2.4x6.4mm | |
| R820 | 2008-000299 | R-FUSIBLE(S);47ohm,5%,2W,AF,TP,3.9x10mm | |
| R821 | 2008-000266 | R-FUSIBLE(S);1ohm,5%,2W,AF,TP,3.9x10mm | |
| R822 | 2001-001150 | R-CARBON(S);470KOHM,5%,1/2W,AA,TP,- | |
| R823 | 2001-001150 | R-CARBON(S);470KOHM,5%,1/2W,AA,TP,- | |
| R825 | 2003-001040 | R-METAL OXIDE(S);47Kohm,5%,2W,AF,TP,3.9x10mm | |
| R901 | 2001-000832 | R-CARBON;510OHM,5%,1/8W,AA,TP,- | |
| R902 | 2001-000734 | R-CARBON;4.7KOHM,5%,1/8W,AA,TP,- | |
| R903 | 2001-000281 | R-CARBON;100OHM,5%,1/8W,AA,TP,- | |
| R904 | 2001-000281 | R-CARBON;100OHM,5%,1/8W,AA,TP,- | |
| R905 | 2001-000241 | R-CARBON;1.5KOHM,5%,1/8W,AA,TP,- | |
| R906 | 2001-000472 | R-CARBON;2.7KOHM,5%,1/8W,AA,TP,- | |
| R907 | 2001-000995 | R-CARBON;820OHM,5%,1/8W,AA,TP,- | |
| R908 | 2001-000232 | R-CARBON;1.3KOHM,5%,1/8W,AA,TP,- | |
| R909 | 2001-000605 | R-CARBON;3.6KOHM,5%,1/8W,AA,TP,- | |
| R910 | 2001-000290 | R-CARBON;10KOHM,5%,1/8W,AA,TP,- | |
| R912 | 2001-000924 | R-CARBON;680OHM,5%,1/8W,AA,TP,- | |
| R916 | 2001-000281 | R-CARBON;100OHM,5%,1/8W,AA,TP,- | |
| R917 | 2001-000281 | R-CARBON;100OHM,5%,1/8W,AA,TP,- | |
| R918 | 2001-000281 | R-CARBON;100OHM,5%,1/8W,AA,TP,- | |
| R919 | 2001-000290 | R-CARBON;10KOHM,5%,1/8W,AA,TP,- | |
| R920 | 2001-000864 | R-CARBON;56KOHM,5%,1/8W,AA,TP,- | |
| R921 | 2001-001062 | R-CARBON(S);10MOHM,5%,1/2W,AA,TP,- | |
| R922 | 2001-000281 | R-CARBON;100OHM,5%,1/8W,AA,TP,- | |
| R923 | 2001-000281 | R-CARBON;100OHM,5%,1/8W,AA,TP,- | |
| R924 | 2001-000449 | R-CARBON;2.2KOHM,5%,1/8W,AA,TP,- | |
| R925 | 2001-000449 | R-CARBON;2.2KOHM,5%,1/8W,AA,TP,- | |
| R926 | 2001-000290 | R-CARBON;10KOHM,5%,1/8W,AA,TP,- | |
| R927 | 2001-000290 | R-CARBON;10KOHM,5%,1/8W,AA,TP,- | |
| R928 | 2001-000066 | R-CARBON(S);10KOHM,5%,1/2W,AA,TP,- | |
| R929 | 2004-000253 | R-METAL;11Kohm,1%,1/8W,AA,TP,1.8x3.2mm | |
| R930 | 2004-000218 | R-METAL;10Kohm,1%,1/8W,AA,TP,1.8x3.2mm | |
| R931 | 2004-000218 | R-METAL;10Kohm,1%,1/8W,AA,TP,1.8x3.2mm | |
| R934 | 2001-000449 | R-CARBON;2.2KOHM,5%,1/8W,AA,TP,- | |
| R936 | 2001-000734 | R-CARBON;4.7KOHM,5%,1/8W,AA,TP,- | |
| R937 | 2001-000734 | R-CARBON;4.7KOHM,5%,1/8W,AA,TP,- | |
| R938 | 2001-000472 | R-CARBON;2.7KOHM,5%,1/8W,AA,TP,- | |
| R940 | 2001-000660 | R-CARBON;33KOHM,5%,1/8W,AA,TP,- | |
| R946 | 2001-000429 | R-CARBON;1KOHM,5%,1/8W,AA,TP,- | |
| R947 | 2001-000429 | R-CARBON;1KOHM,5%,1/8W,AA,TP,- | |
| R948 | 2001-000241 | R-CARBON;1.5KOHM,5%,1/8W,AA,TP,- | |
| R951 | 2001-000734 | R-CARBON;4.7KOHM,5%,1/8W,AA,TP,- | |
| R952 | 2001-000281 | R-CARBON;100OHM,5%,1/8W,AA,TP,- | |
| R954 | 2001-000006 | R-CARBON;2.4KOHM,5%,1/8W,AA,TP,- | |
| R955 | 2001-000429 | R-CARBON;1KOHM,5%,1/8W,AA,TP,- | |
| R956 | 2001-000429 | R-CARBON;1KOHM,5%,1/8W,AA,TP,- | |
| R960 | 2001-000290 | R-CARBON;10KOHM,5%,1/8W,AA,TP,- | |
| R962 | 2001-000273 | R-CARBON;100KOHM,5%,1/8W,AA,TP,- | |
| RA01 | 2001-000924 | R-CARBON;680OHM,5%,1/8W,AA,TP,- | |
| RA02 | 2001-000241 | R-CARBON;1.5KOHM,5%,1/8W,AA,TP,- | |
| RA03 | 2001-000734 | R-CARBON;4.7KOHM,5%,1/8W,AA,TP,- | |
| RA04 | 2001-000734 | R-CARBON;4.7KOHM,5%,1/8W,AA,TP,- | |
| RL901 | AA59-60001U | MODULE-REMOCON;-,ORC-50VF/SR-12V,38KHz,940nm, | |
| RW701 | 2011-001133 | R-NETWORK;33K/24K/75x3,5%,1/8W,X,SIP,6P, | |
| RW702 | 2011-001098 | R-NETWORK;75/75/1K/750HM,5%,1/8W,-,SIP,5P,TP | |
| RX801 | 2002-001011 | R-COMPOSITION;3.3Mohm,10%,1/2W,AA,TP,3.7x9mm | |
| SFN02 | 2904-001063 | FILTER-SAW AV;38.9MHz,SIP5K,TP,17dB,PAL-B/G, | |
| SW801 | 3403-000179 | SWITCH-PUSH;250V,5A,DPST,-,JPW-2104B | |
| SW901 | 3404-000244 | SWITCH-TACT;15V,20mA,90-170gf,7.5x7mm,SPST | |
| SW902 | 3404-000244 | SWITCH-TACT;15V,20mA,90-170gf,7.5x7mm,SPST | |
| SW903 | 3404-000244 | SWITCH-TACT;15V,20mA,90-170gf,7.5x7mm,SPST | |
| SW904 | 3404-000244 | SWITCH-TACT;15V,20mA,90-170gf,7.5x7mm,SPST | |
| SW905 | 3404-000244 | SWITCH-TACT;15V,20mA,90-170gf,7.5x7mm,SPST | |
| T401 | AA26-50001B | HORIZ.DRIVE;-,7.1mH,102uH,10-20uH,YL081,ST | |
| T444 | AA26-00004A | TRANS-FLYBACK;-,FSA38026S,14INCH,125V | |
| T801 | AA26-20007Q | TRANS-SWITCHING;-,180-260V,125V/12.5V,EN,EER28 | |
| TU01 | AA40-10006P | TUNER-V/S;TECC0949VG28B(S),PAL-B/G,TR,18 | |
| V999 | 3704-001089 | SOCKET-CRT;7P,22.5PI,12PI,SN,- | |
| X202 | 2801-000226 | CRYSTAL-UNIT;3.579545MHz,20ppm,28-AAM,15pF, | |
| X203 | 2801-000274 | CRYSTAL-UNIT;4.433619MHz,30ppm,28-AAM,20pF, | |
| X901 | 2801-000724 | CRYSTAL-UNIT;6MHz,50ppm,28-AAM,20pF,40ohm,T | |
| Z201 | 2903-000199 | FILTER-CERAMIC;TR,6.5MHz,70KHz,-,-,TP,- | |
| Z202 | 2903-000181 | FILTER-CERAMIC;TR,5.5MHz,-,-,-,TP,TPS5.5MB-TF | |
| Z204 | 2903-000184 | FILTER-CERAMIC;BP,5.5MHz,+-60KHz,6dB,-,TP,- | |
| Z205 | 2903-000202 | FILTER-CERAMIC;BP,6.5MHz,+-80KHz,6dB,-,TP,- | |
| Z206 | 2903-000184 | FILTER-CERAMIC;BP,5.5MHz,+-60KHz,6dB,-,TP,- | |
| Z210 | 2903-000200 | FILTER-CERAMIC;BP,6.5MHz,+-70KHz,6dB,-,TP,- | |
| | AA39-20010D | LEAD-CONNECTOR,ASSY;-,YFH800-01,S,1P,400,1617#22 | |

## ASSY-CRT

| | | | |
|---|---|---|---|
| | AA03-10001D | CRT-COLOR;-,A34KQV42X,+380MG,14,90DEG,5 | |
| | AA27-00001A | MAGNET-CONVERGENCE;-,JH225-06A,22.5MM | |
| | AA27-50004X | DEFLECTION-YOKE;-,DSE-1422FL(G),14/A34KQV42X, | |
| | AA63-60028A | SPACER-DY;NEOPRENE,-,BLK,V0 W12,-,- | |

## ASSY-SPEAKER

| | | | |
|---|---|---|---|
| | 3001-000275 | SPEAKER;2.5W,16ohm,90dB,105Hz | |
| | AA39-20501A | LEAD CONNECTOR-ASSY;-,67096-003,REC,3(2),200,1007# | |

## ASSY-POWER,CORD

| | | | |
|---|---|---|---|
| | AA39-10001G | POWER-CORD;-,KKP-419C,KLCE-2F,2.286m,HOUS | |
| | AA61-20284A | HOLDER;-,P-CORD,PP,VO,BLK,KE-002 | |

## REMOCON

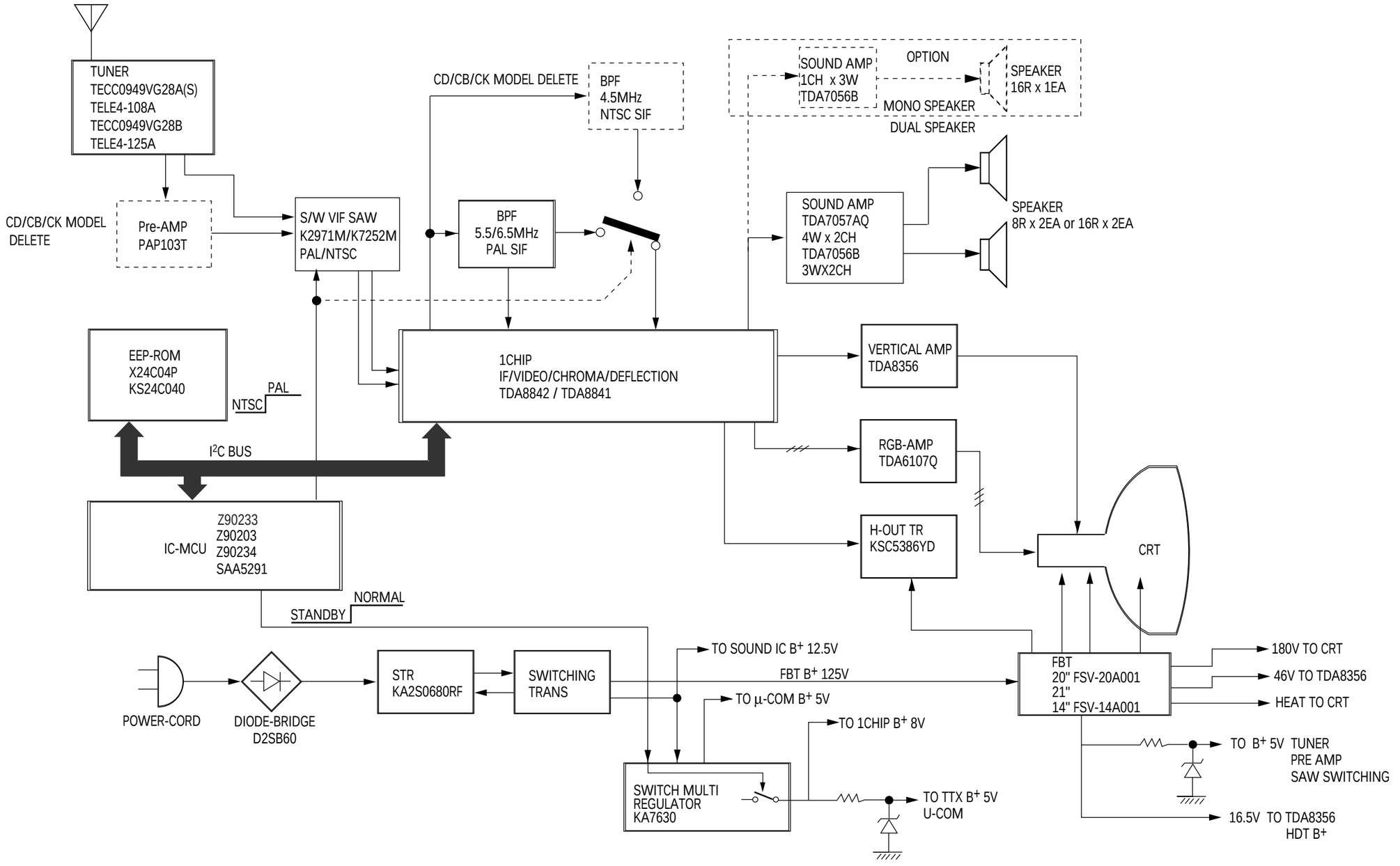
| | | | |
|---|---|---|---|
| * | AA59-10107N | REMOCON;-,TM59,SS,SZM173EA,24,-,-,L/GR | |

## ASSY-ACCESSORY

| | | | |
|---|---|---|---|
| | AA26-90001C | TRANS-MATCHING;-,300ohm/75ohm,PAL,40-890MHz | |
| | AA42-10001V | ANT-ROD;-,3S,620mm,BRN,UL/CSA<br>CK331FVR5X/BWT,VWT | |
| | AA68-11259A | MANUAL-USERS;S15A,RUSSIAN,W/O TTX,B5,W/P 10<br>CK331FVR5S/NWT | |
| | AA68-11289A | MANUAL-USERS;S15A,N-RUSSIA,W/O TTX,B5,W/P 1 | |

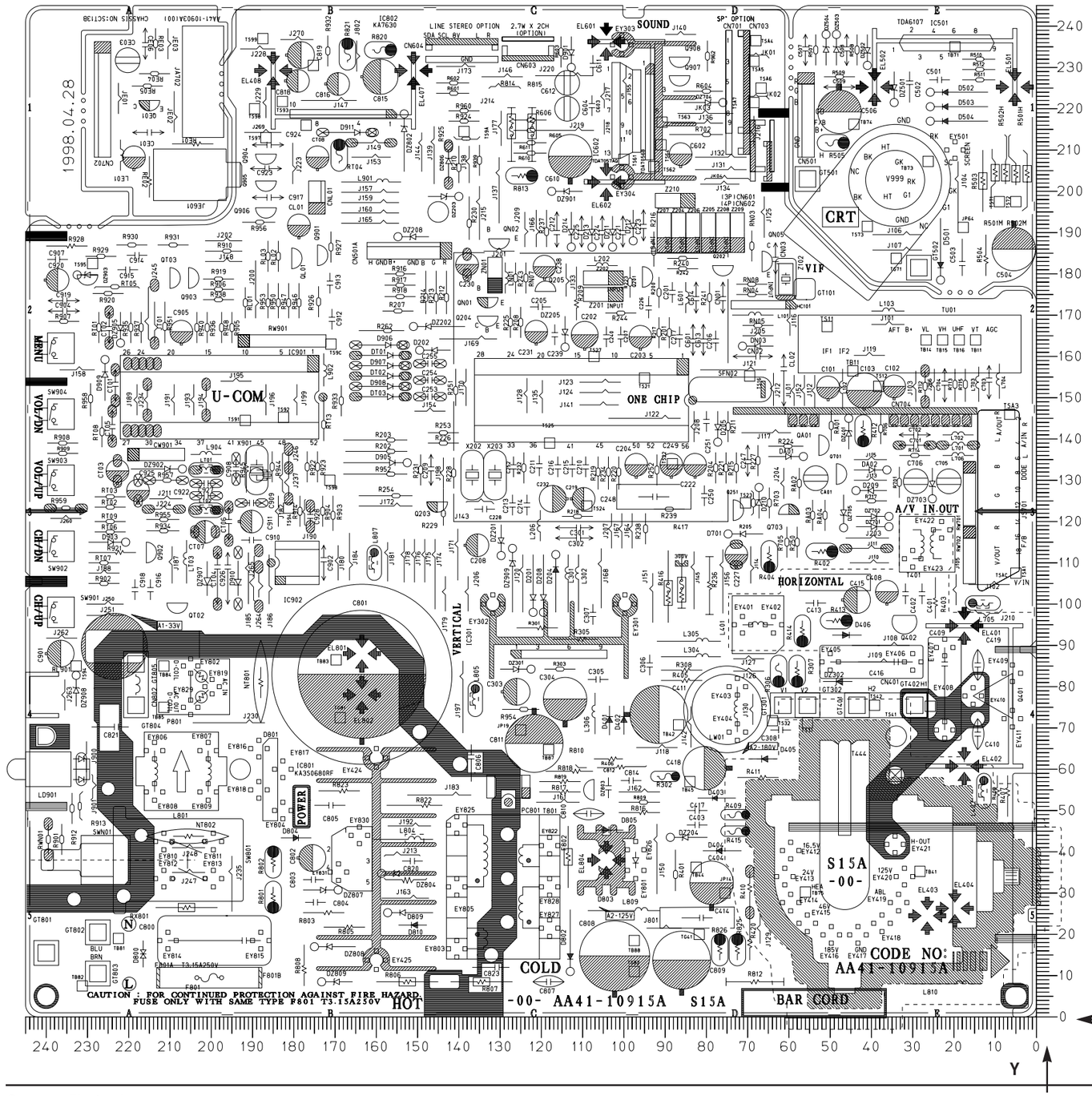
# 8. Block Diagram

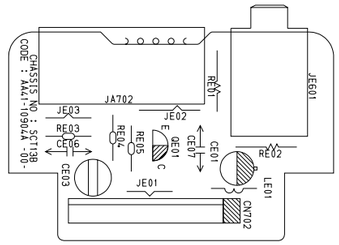
## 8-1 S15A

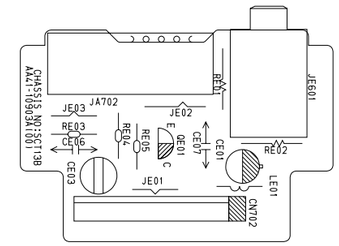


# 10. PCB Layout

## 10-1 PCB Main

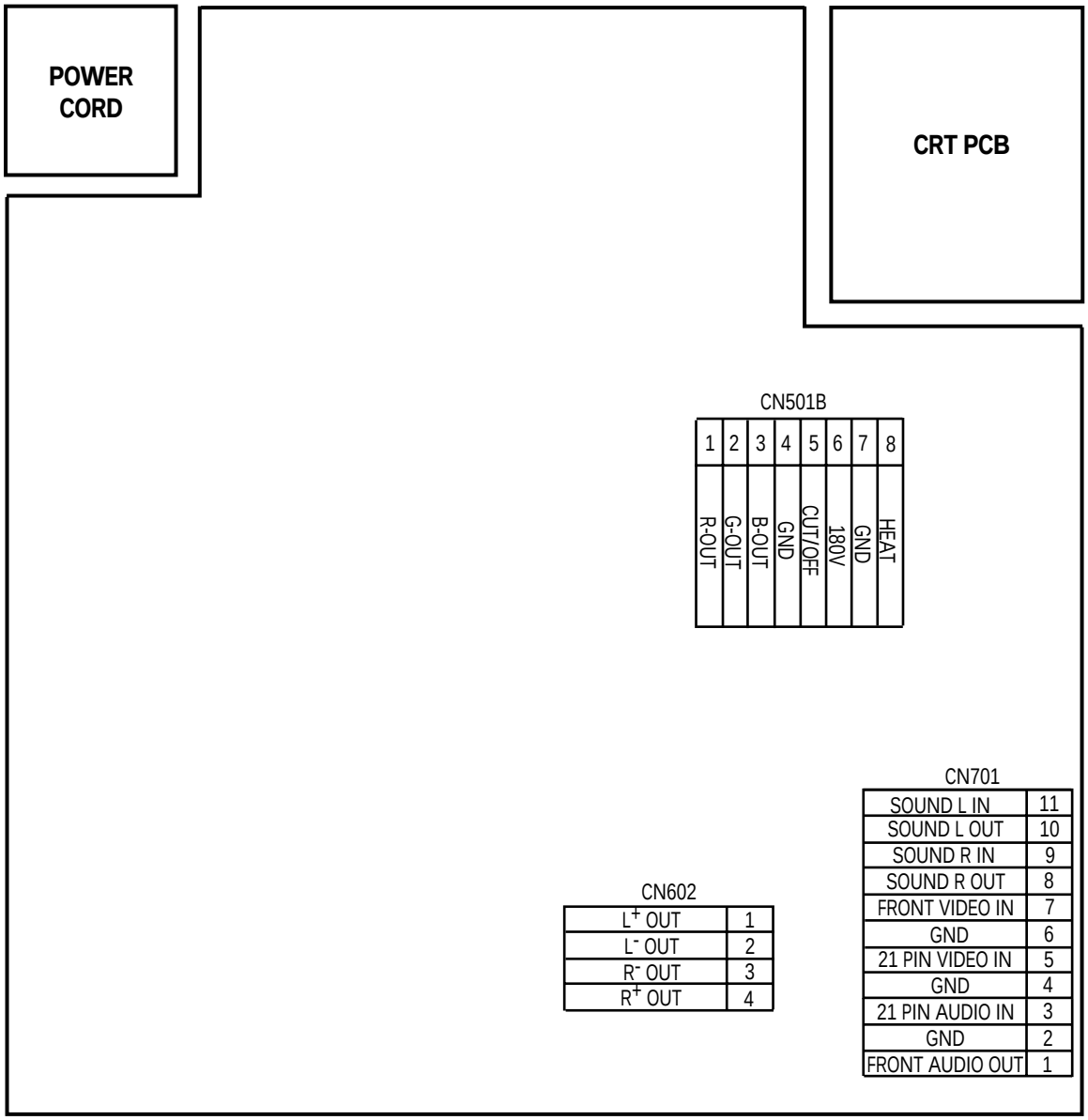



| Loc. No. | X | Y |
|---|---|---|
| **DIODE** | | |
| D201 | 122 | 98 |
| D202 | 149 | 161 |
| D204 | 116 | 112 |
| D205 | 77 | 139 |
| D208 | 119 | 98 |
| D209 | 43 | 127 |
| D210 | 67 | 128 |
| D211 | 102 | 186 |
| D212 | 97 | 188 |
| D213 | 107 | 186 |
| D214 | 112 | 186 |
| D401 | 103 | 78 |
| D402 | 100 | 78 |
| D403 | 84 | 53 |
| D404 | 83 | 40 |
| D405 | 72 | 62 |
| D406 | 39 | 92 |
| D501 | 23 | 178 |
| D502 | 25 | 224 |
| D503 | 25 | 220 |
| D504 | 25 | 217 |
| D701 | 74 | 117 |
| D800 | 216 | 19 |
| D801 | 188 | 65 |
| D802 | 113 | 11 |
| D803 | 104 | 38 |
| D805 | 97 | 45 |
| D809 | 157 | 25 |
| D810 | 157 | 22 |
| D901 | 112 | 230 |
| D903 | 220 | 115 |
| D905 | 152 | 134 |
| D906 | 153 | 162 |
| D907 | 153 | 157 |
| D908 | 153 | 152 |
| D909 | 225 | 159 |
| D910 | 193 | 100 |
| D911 | 161 | 214 |
| DA01 | 56 | 135 |
| DA02 | 36 | 132 |
| DN03 | 71 | 162 |
| DT01 | 153 | 160 |
| DT02 | 153 | 155 |
| DT03 | 153 | 150 |
| DZ201 | 129 | 111 |
| DZ202 | 151 | 167 |
| DZ203 | 140 | 198 |
| DZ204 | 88 | 43 |
| DZ205 | 114 | 162 |
| DZ208 | 154 | 189 |
| DZ301 | 122 | 84 |
| DZ302 | 54 | 81 |
| DZ401 | 45 | 145 |
| DZ501 | 34 | 221 |
| DZ502 | 41 | 230 |
| DZ503 | 48 | 238 |
| DZ504 | 51 | 238 |
| DZ701 | 35 | 118 |
| DZ702 | 35 | 121 |
| DZ703 | 25 | 125 |
| DZ704 | 76 | 221 |

| Loc. No. | X | Y |
|---|---|---|
| DZ705 | 46 | 118 |
| DZ802 | 153 | 218 |
| DZ803 | 107 | 57 |
| DZ804 | 158 | 34 |
| DZ806 | 142 | 211 |
| DZ807 | 169 | 30 |
| DZ808 | 175 | 17 |
| DZ809 | 173 | 8 |
| DZ901 | 117 | 200 |
| DZ902 | 207 | 132 |
| DZ903 | 232 | 179 |
| DZ905 | 222 | 163 |
| DZ907 | 201 | 100 |
| DZ908 | 232 | 82 |
| DZ909 | 127 | 113 |
| **IC** | | |
| HC101 | 59 | 172 |
| IC201 | 86 | 141 |
| IC301 | 99 | 100 |
| IC501 | 39 | 225 |
| IC602 | 100 | 235 |
| IC801 | 160 | 13 |
| IC802 | 151 | 229 |
| IC901 | 175 | 142 |
| IC902 | 183 | 114 |
| **TRANSISTOR** | | |
| Q201 | 95 | 176 |
| Q202 | 78 | 182 |
| Q203 | 147 | 124 |
| Q204 | 135 | 169 |
| Q205 | 116 | 175 |
| Q251 | 73 | 120 |
| Q401 | 17 | 94 |
| Q402 | 34 | 95 |
| Q701 | 48 | 129 |
| Q703 | 57 | 121 |
| Q901 | 174 | 182 |
| Q902 | 215 | 110 |
| Q903 | 205 | 176 |
| Q904 | 189 | 209 |
| Q905 | 189 | 202 |
| Q906 | 189 | 196 |
| Q907 | 89 | 228 |
| Q908 | 89 | 232 |
| QA01 | 52 | 136 |
| QE01 | 217 | 222 |
| QL01 | 180 | 181 |
| QN01 | 135 | 174 |
| QN02 | 132 | 188 |
| QN05 | 66 | 180 |
| QT02 | 210 | 100 |
| QT03 | 210 | 176 |

# 10. Wiring Diagram

## 10-1 S15A